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L86 ANSWER 1 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:529221 HCAPLUS  
DN 133:149135  
TI Sequential separation of whey protein  
IN Mozaffar, Zahid; Ahmed, Salah H.; Saxena, Vinit; Miranda, Quirinus Ronnie  
PA Sepragen Corporation, USA  
SO U.S., 47 pp., Cont.-in-part of U.S. 5,756,680.  
CODEN: USXXAM  
DT Patent  
LA English  
IC ICM C07K016-04  
ICS C07K014-47; A23C009-12  
NCL 530366000  
CC 15-3 (Immunochemistry)  
Section cross-reference(s): 9, 17, 63  
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6096870	A	20000801	US 1998-76169	19980504 <--
	US 5756680	A	19980526	US 1996-678364	19960716 <--
PRAI	US 1994-177574	B1	19940105 <--		
	US 1996-678364	A2	19960716 <--		

AB The present invention is related to the sepn. of whey proteins, particularly the sequential sepn. of whey proteins into sep. fractions through the use of chromatog. The present invention further provides methods and compns. for the sequential sepn. of whey proteins, as well as their use in various products. The present invention also provides methods and compns. for the cleaning of chromatog. resins used in the sepn. of whey proteins. The whey protein is selected from the group consisting of Ig. (e.g. IgG), .beta.-lactoglobulin, .alpha.-lactalbumin, lactoperoxidase, serum albumin, and lactoferrin; and the products is nutritional or supplements, feed constituent, and/or filler as well as food products such as sports drinks, fruit gels, ice cream, cookies, beverages, confectionery items, candies, convenience food, desserts, baked goods, sauces, infant foods and formulas, geriatric foods, animal feeds and as drug constituent.

ST whey protein chromatog sepn nutrient supplement

IT Immunoglobulins  
RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(G; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Whey  
(acid, pasteurized; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Flow  
(axial, chromatog. column; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT **Polymers**, biological studies  
RL: BUU (Biological use, unclassified); DEV (Device component use); BIOL (Biological study); USES (Uses)  
(carboxymethyl or dithylaminoethyl; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Containers  
(chamber; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT **Anion exchangers**  
Bakery products  
Beverages  
Buffers  
Candy  
**Cation exchangers**  
Chromatography  
Confectionery  
Containers  
Desserts  
Emulsifying agents  
Feed  
Fillers  
Freeze drying  
Ice cream  
Nutrients  
Sauces (condiments)  
Tanks (containers)  
Ultrafilters  
(**chromatog.** sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Minerals, biological studies  
Vitamins  
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)  
(chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Immunoglobulins  
Lactoferrins  
Lipoproteins  
RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Drugs  
Health products  
(constituents; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Bakery products  
(cookies; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Sponges (artificial)

- (crosslinked flexible absorbent; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Absorbents  
(crosslinked flexible sponge; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Containers  
(cups; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Aging, animal  
(food; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Food gels  
(fruit; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Fruit  
(gels; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Milk substitutes  
(human, non-allergic; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Food  
(infant, non-allergic; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Whey  
(pasteurized; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Flow  
(radial flow, chromatog. column; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Liquid chromatography  
(radial or axial; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Proteins, general, biological studies  
RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(sepn.; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Albumins, biological studies  
RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(serum; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Beverages  
(sports; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Drying  
(spray; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Food  
(supplement; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Containers  
(vat; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Proteins, specific or class  
RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(whey; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)
- IT Lactalbumins

RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)

(.alpha.-; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT Lactoglobulins

RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)

(.beta.-; chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT 50-21-5, Lactic acid, biological studies 63-42-3, Lactose 64-17-5, Ethanol, biological studies 127-09-3, Sodium acetate 994-36-5, Sodium citrate 1310-73-2, Sodium hydroxide, biological studies **7647-01-0**, Hydrochloric acid, biological studies **7647-14-5**

, Sodium chloride, biological studies 7681-52-9, Sodium hypochlorite  
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)

(chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT 106-91-2D, Glycidyl methacrylate, **copolymers** 111-46-6D, Diethylene glycol, crosslinked 136218-99-0, Macro-Prep 50S 140876-37-5, Macro-Prep 50Q 188039-62-5, Macro-Prep High S 203210-61-1, Macro-Prep HQ 287118-15-4, SeptraSorb CM 287118-16-5, SeptraSorb DE

RL: BUU (Biological use, unclassified); DEV (Device component use); BIOL (Biological study); USES (Uses)

(chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

IT 9003-99-0P, Lactoperoxidase

RL: BUU (Biological use, unclassified); FFD (Food or feed use); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)

(chromatog. sepn. of whey proteins for use in food, nutritional and supplements, feed and drug products)

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IT 7647-01-0, Hydrochloric acid, biological studies 7647-14-5  
, Sodium chloride, biological studies  
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES  
(Uses)  
(chromatog. sepn. of whey proteins for use in food, nutritional and  
supplements, feed and drug products)  
RN 7647-01-0 HCAPLUS  
CN Hydrochloric acid (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HCl

RN 7647-14-5 HCAPLUS  
CN Sodium chloride (NaCl) (9CI) (CA INDEX NAME)

Cl-Na

L86 ANSWER 2 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:129194 HCAPLUS  
DN 132:276538  
TI A folding variant of .alpha.-lactalbumin with  
bactericidal activity against Streptococcus pneumoniae  
AU Hakansson, Anders; Svensson, Malin; Mossberg,  
Ann-Kristin; Sabharwal, Hemant; Linse, Sara; Lazou, Irene; Lonnerdal, Bo;  
Svanborg, Catharina  
CS Department of Microbiology, Immunology and Glycobiology, Institute of  
Laboratory Medicine, Lund University, Lund, SE-223 62, Swed.  
SO Molecular Microbiology (2000), 35(3), 589-600  
CODEN: MOMIEE; ISSN: 0950-382X  
PB Blackwell Science Ltd.  
DT Journal  
LA English

*bad date*

CC 10-5 (Microbial, Algal, and Fungal Biochemistry)  
 AB This study describes an **.alpha.-lactalbumin** folding variant from human milk with bactericidal activity against antibiotic-resistant and -susceptible strains of *Streptococcus pneumoniae*. The active complex pptd. with the casein fraction at pH 4.6 and was purified from casein by a combination of anion exchange and gel chromatog. Unlike other casein components, the active complex was retained on the ion-exchange matrix and eluted only with high salt. The eluted fraction showed N-terminal and mass spectrometric identity with human milk **.alpha.-lactalbumin**, but native **.alpha.-lactalbumin** had no bactericidal effect. Spectroscopic anal. demonstrated that the active form of the mol. was in a different folding state, with secondary structure identical to **.alpha.-lactalbumin** from human milk whey, but fluctuating tertiary structure. Native **.alpha.-lactalbumin** could be converted to the active bactericidal form by **ion-exchange chromatog.** in the presence of a cofactor from human milk casein, characterized as a C18:1 fatty acid. Anal. of the antibacterial spectrum showed selectivity for streptococci; Gram-neg. and other Gram-pos. bacteria were resistant. The folding variant of **.alpha.-lactalbumin** is a new example of naturally occurring mols. with antimicrobial activity.

ST **lactalbumin** antibacterial *Streptococcus*  
 IT Antibacterial agents  
*Streptococcus pneumoniae*  
 (folding variant of **.alpha.-lactalbumin** from human milk with bactericidal activity against *Streptococcus pneumoniae*)

IT Milk  
 (human; folding variant of **.alpha.-lactalbumin** from human milk with bactericidal activity against *Streptococcus pneumoniae*)

IT **Lactalbumins**  
 RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation)  
 (**.alpha.-**; folding variant of **.alpha.-lactalbumin** from human milk with bactericidal activity against *Streptococcus pneumoniae*)

RE.CNT 50 THERE ARE 50 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L86 ANSWER 3 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1999:733053 HCAPLUS

DN 131:334330

TI Isolating .beta.-lactoglobulin and .alpha.-lactalbumin  
by eluting from a cation exchanger without sodium chloride

IN Etzel, Mark R.

PA Wisconsin Alumni Research Foundation, USA

SO U.S., 16 pp.

CODEN: USXXAM

DT Patent

LA English

IC ICM C07K001-18

ICS C07K014-435; A23J001-20

NCL 530366000

CC 9-3 (Biochemical Methods)

Section cross-reference(s):13

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5986063	A	19991116	US 1998-126904	19980731 <--
PRAI	US 1998-126904		19980731	<--	

AB A method is provided for isolating the proteins, .beta.-lactoglobulin and .alpha.-lactalbumin, from whey with a single cation exchanger, and using different pH values for eluting the proteins as sep. fractions without using salt elution. A whey protein soln. is adjusted to a pH of less than about 4.5. The soln. is contacted with a cation exchanger to obtain a bound fraction contg. .alpha.-lactalbumin and .beta.-lactoglobulin. The bound fraction is adjusted to a pH of about 4.0 to 6.0 and a .beta.-lactoglobulin fraction is eluted at this pH in the absence of sodium chloride. The pH of an remaining bound fraction is adjusted to about 6.5 or greater and an .alpha.-lactalbumin fraction is eluted. The method is advantageously conducted at elevated temps. ranging from 35.degree. C. to 50.degree. C. The ion exchanger may be cross-linked polymeric beads made of cellulose, agarose or dextran, or a microporous

**polymeric** membrane made of regenerated cellulose, polysulfone or cellulose acetate, and may contain charged immobilized mols. such as carboxymethyl or sulfopropyl moieties.

ST whey lactoglobulin **lactalbumin** cation exchange chromatog pH

IT Membranes, nonbiological

(porous, contg. charged immobilized groups, as cation exchanger;  
.beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium chloride)

IT Proteins, specific or class

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(whey; .beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium chloride)

IT **Lactalbumins**

RL: PUR (Purification or recovery); **PREP (Preparation)**  
(**.alpha.-**; .beta.-lactoglobulin and **.alpha.-**  
**lactalbumin** isolation from whey by eluting from cation  
exchanger without sodium chloride)

IT Lactoglobulins

RL: PUR (Purification or recovery); PREP (Preparation)  
(.beta.-; .beta.-lactoglobulin and **.alpha.-**  
**lactalbumin** isolation from whey by eluting from cation  
exchanger without sodium chloride)

IT **Cation exchange chromatography**

**Cation exchangers**

Whey

pH

(.beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium  
chloride)

IT 71-00-1, L-Histidine, uses 7786-30-3, Magnesium chloride, uses  
10043-52-4, Calcium chloride, uses

RL: NUU (Other use, unclassified); **USES (Uses)**  
(in **.alpha.-lactalbumin** desorption;  
.beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium  
chloride)

IT **7647-14-5**, Sodium chloride, miscellaneous

RL: MSC (Miscellaneous)  
(.beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium  
chloride)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Uchida; US 5516675 1996 HCAPLUS

IT **7647-14-5**, Sodium chloride, miscellaneous

RL: MSC (Miscellaneous)  
(.beta.-lactoglobulin and **.alpha.-lactalbumin**  
isolation from whey by eluting from cation exchanger without sodium  
chloride)

RN 7647-14-5 HCAPLUS

CN Sodium chloride (NaCl) (9CI) (CA INDEX NAME)

Cl-Na

L86 ANSWER 4 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1999:355804 HCAPLUS

DN 131:23495

TI **Ion exchange chromatography** for preparation

of .alpha.-lactalbumin  
 IN Svanborg, Catharina; Svensson, Malin Wilhelmina;  
 Hakansson, Per Anders  
 PA Swed.  
 SO PCT Int. Appl., 49 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM C07K014-76  
 ICS A61K038-38; B01D015-08  
 CC 63-3 (Pharmaceuticals)  
 Section cross-reference(s): 1  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9926979	A1	19990603	WO 1998-IB1919	19981123 <--
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 9912541	A1	19990615	AU 1999-12541	19981123 <--
	EP 1032596	A1	20000906	EP 1998-955823	19981123 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2001524491	T2	20011204	JP 2000-522135	19981123 <--
PRAI	GB 1997-24725	A	19971121 <--		
	GB 1998-12202	A	19980605 <--		
	WO 1998-IB1919	W	19981123 <--		

AB An ion exchange method for prepn. of an **oligomeric** form of .  
**alpha.-lactalbumin** comprises exposing a source of .  
**alpha.-lactalbumin**, in which the .**alpha.-**  
**lactalbumin** is preferably in the **globule**-like state, to  
 an ion exchange medium which has been pretreated with casein or an active  
 component thereof, such as oleic acid, and recovering .**alpha.-**  
**lactalbumin** in an **oligomeric** form therefrom.  
 Pretreatment of the ion exchange medium, particularly with casein derived  
 from human milk, has been found to significantly improve yields of the  
**oligomeric** form of .**alpha.-lactalbumin** and  
 mean that it can readily isolated from readily available sources such as  
 bovine .**alpha.-lactalbumin**. This form of .  
**alpha.-lactalbumin** is useful therapeutically, in  
 particular as an antibacterial agent and also as an anticancer  
 therapeutic. The occurrence of DNA fragmentation, indicative of  
 apoptosis, was obsd. when tumor cells were treated with **multimeric**  
**alpha.-lactalbumin** prepd. by using a DEAE-trisacryl M  
 ion exchange column.

ST milk **lactalbumin** ion exchange antibacterial anticancer

IT Liquid **chromatographic** stationary phases  
 Liquid **chromatographic** stationary phases  
 (anion exchange; ion exchange  
 chromatog. for prepn. of .**alpha.-lactalbumin**  
 for therapeutic uses)

IT Chelating agents  
 (calcium; ion exchange chromatog. for  
 prepn. of .**alpha.-lactalbumin** for therapeutic uses)

IT Fatty acids, uses  
 Lipids, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (casein; ion exchange chromatog. for

*had date*

prepn. of .alpha.-lactalbumin for therapeutic uses)

IT Milk  
Milk  
(frozen; ion exchange chromatog. for  
prepn. of .alpha.-lactalbumin for therapeutic uses)

IT Antibacterial agents  
Antitumor agents  
Ion exchange  
Ion exchange liquid chromatography  
Milk  
(ion exchange chromatog. for prepn. of  
.alpha.-lactalbumin for therapeutic uses)

IT Caseins, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(ion exchange chromatog. for prepn. of  
.alpha.-lactalbumin for therapeutic uses)

IT Frozen foods  
Frozen foods  
(milk; ion exchange chromatog. for prepn.  
of .alpha.-lactalbumin for therapeutic uses)

IT Anion exchange liquid chromatography  
Anion exchange liquid chromatography  
(stationary phases; ion exchange chromatog  
. for prepn. of .alpha.-lactalbumin for therapeutic  
uses)

IT Lactalbumins  
RL: BAC (Biological activity or effector, except adverse); BSU (Biological  
study, unclassified); PUR (Purification or recovery); THU (Therapeutic  
use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(.alpha.-; ion exchange chromatog  
. for prepn. of .alpha.-lactalbumin for therapeutic  
uses)

IT 1185-53-1, TRIS hydrochloride  
RL: PRP (Properties)  
(buffer contg.; ion exchange chromatog.  
for prepn. of .alpha.-lactalbumin for therapeutic  
uses)

IT 80701-61-7, DEAE-trisacryl M  
RL: ARU (Analytical role, unclassified); ANST (Analytical study)  
(column; ion exchange chromatog. for  
prepn. of .alpha.-lactalbumin for therapeutic uses)

IT 60-00-4, EDTA, uses 112-80-1, 9-Octadecenoic acid (9Z)-,  
uses 7647-01-0, Hydrochloric acid, uses 7647-14-5,  
Sodium chloride, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(ion exchange chromatog. for prepn. of  
.alpha.-lactalbumin for therapeutic uses)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Jegouic, M; Journal of Agricultural and Food Chemistry 1997, V45(1), P19  
HCAPLUS

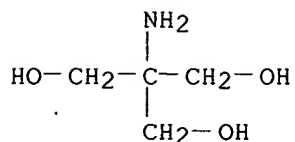
(2) Sabharwal & Svanborg; WO 9604929 A 1996 HCAPLUS

(3) Snow Brand Milk Products; FR 2671697 A 1992 HCAPLUS

IT 1185-53-1, TRIS hydrochloride  
RL: PRP (Properties)  
(buffer contg.; ion exchange chromatog.  
for prepn. of .alpha.-lactalbumin for therapeutic  
uses)

RN 1185-53-1 HCAPLUS

CN 1,3-Propanediol, 2-amino-2-(hydroxymethyl)-, hydrochloride (8CI, 9CI) (CA  
INDEX NAME)

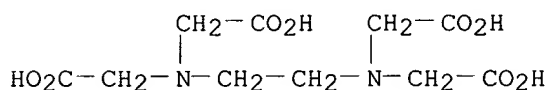


● HCl

IT 80701-61-7, DEAE-trisacryl M  
 RL: ARU (Analytical role, unclassified); ANST (Analytical study)  
 (column; ion exchange chromatog. for  
 prepn. of .alpha.-lactalbumin for therapeutic uses)  
 RN 80701-61-7 HCAPLUS  
 CN Trisacryl M-DEAE (9CI) (CA INDEX NAME)

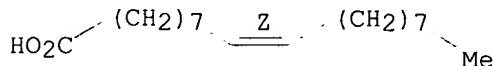
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 60-00-4, EDTA, uses 112-80-1, 9-Octadecenoic acid (9Z)-,  
 uses 7647-01-0, Hydrochloric acid, uses 7647-14-5,  
 Sodium chloride, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (ion exchange chromatog. for prepn. of  
 .alpha.-lactalbumin for therapeutic uses)  
 RN 60-00-4 HCAPLUS  
 CN Glycine, N,N'-1,2-ethanediylbis[N-(carboxymethyl)- (9CI) (CA INDEX NAME)



RN 112-80-1 HCAPLUS  
 CN 9-Octadecenoic acid (9Z)- (9CI) (CA INDEX NAME)

Double bond geometry as shown.



RN 7647-01-0 HCAPLUS  
 CN Hydrochloric acid (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HCl

RN 7647-14-5 HCAPLUS  
 CN Sodium chloride (NaCl) (9CI) (CA INDEX NAME)

Cl-Na

L86 ANSWER 5 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
 AN 1999:231486 HCAPLUS  
 DN 130:266618  
 TI Sequential separation of whey proteins by radial-flow chromatography and

use of proteins in infant formula  
 IN Ahmed, Salah H.; Saxena, Vinit; Miranda, Quirinus  
 PA Sepragen Corporation, USA  
 SO PCT Int. Appl., 37 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM A23C009-14  
 CC 17-8 (Food and Feed Chemistry)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9915024	A1	19990401	WO 1997-US16993	19970922 <--
	W: AU, CA, JP, KR, NZ				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	AU 9745893	A1	19990412	AU 1997-45893	19970922 <--
	EP 1017286	A1	20000712	EP 1997-944384	19970922 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2001516599	T2	20011002	JP 2000-512418	19970922 <--
	NZ 503566	A	20021025	NZ 1997-503566	19970922 <--
PRAI	WO 1997-US16993	A	19970922	<--	
AB	Buffer systems adjusted to suitable pH and ionic strength are utilized for sequential sepn. of whey proteins by radial-flow chromatog. The method permits sepn. of Ig, .beta.-lactoglobulin, .alpha.-lactalbumin, bovine serum albumin, and lactoferrin. Infant feeding formulas, and other food formulations may incorporate the various proteins sepd. from the whey. Thus, whey from mozzarella cheese manuf. is clarified, pasteurized, and the pH is adjusted to 3.8 for radial flow chromatog. on a column prepacked with a strong S cation exchange resin. Nonprotein constituents pass through the column, and the protein fractions are sequentially eluted.				
ST	whey protein radial flow chromatog				
IT	Milk substitutes (human; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	Caseins, biological studies RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses) (hydrolyzates; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	Liquid chromatography (radial-flow; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	Proteins, general, preparation RL: PUR (Purification or recovery); PREP (Preparation) (sepn.; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	<b>Cation exchangers</b> Sweetening agents Ultrafiltration Whey (sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	Carbohydrates, biological studies Fat substitutes Mineral elements, biological studies Vitamins RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses) (sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)				
IT	Immunoglobulins Lactoferrins RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL				

(Biological study); PREP (Preparation); USES (Uses)  
(sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

IT Albumins, biological studies  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(serum; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

IT Milk  
(solids; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

IT Proteins, specific or class  
RL: FFD (Food or feed use); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)  
(whey; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

IT Lactalbumins  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
(.alpha.-; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

IT Lactoglobulins  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(.beta.-; sequential sepn. of whey proteins by radial-flow chromatog. and use of proteins in infant formula)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE  
(1) Harju; US 4820348 A 1989 HCAPLUS  
(2) Lauer; US 3969337 A 1976 HCAPLUS  
(3) Moeller; US 5085881 A 1992  
(4) Thibault; US 5077067 A 1991 HCAPLUS

L86 ANSWER 6 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1998:699847 HCAPLUS  
DN 130:80601  
TI Rapid separation of bovine whey proteins by membrane convective liquid chromatography, perfusion chromatography, continuous bed chromatography, and capillary electrophoresis  
AU Girardet, Jean-Michel; Saulnier, Franck; Linden, Guy; Humbert, Gerard  
CS Laboratoire des biosciences de l'aliment, unite associee a l'Inra, Faculte des sciences, universite Henri-Poincare Nancy I, Vandoeuvre-les-Nancy, 54506, Fr.  
SO Lait (1998), 78(4), 391-400  
CODEN: LAITAG; ISSN: 0023-7302  
PB Editions Scientifiques et Medicales Elsevier  
DT Journal  
LA English  
CC 17-6 (Food and Feed Chemistry)  
AB Membrane convective liq. chromatog. is a technique based on porous cellulose membranes designed for the sepn. of biomols. in few minutes at high flow-rates and low back-pressures. Bovine whey proteins are sepd. in less than 10 min, at pH 8.5, with a flow-rate of 5.6 mL/min and with a 0-0.2 mol/L NaCl linear gradient. Three other rapid methods are also proposed. With the ion-exchange perfusion liq. chromatog. based on beads with large pores and with the continuous bed chromatog. based on a polymer matrix, sepns. are achieved in only 10 min. Capillary zone electrophoresis using an untreated fused-silica capillary allows the sepn. of whey proteins in a single run of 8 min without the presence of polymeric additives. These rapid methods are suitable in the quality control of wheys and could be applied in the dairy industry or in research.

ST whey protein sepn liq chromatog electrophoresis

*had date*

- IT Chromatography  
(continuous bed; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Capillary electrophoresis  
Liquid chromatography  
(rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Albumins, preparation  
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)  
(serum; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Proteins, specific or class  
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)  
(whey; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Lactalbumins  
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); **PREP (Preparation)**; PROC (Process)  
(.alpha.-; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Lactoglobulins  
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)  
(.beta.-, A; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)
- IT Lactoglobulins  
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)  
(.beta.-, B; rapid sepn. of bovine whey proteins by membrane convective liq. chromatog., perfusion chromatog., continuous bed chromatog., and capillary electrophoresis)

RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Afeyan, N; J Chromatogr 1990, V519, P1 HCAPLUS
- (2) Andrews, A; J Chromatogr 1985, V348, P177 HCAPLUS
- (3) Cifuentes, A; J Dairy Sci 1993, V76, P1870 HCAPLUS
- (4) Gerstner, J; J Chromatogr 1992, V596, P173 HCAPLUS
- (5) Girardet, J; Milchwissenschaft 1989, V44, P692 HCAPLUS
- (6) Hjerten, S; J Chromatogr 1989, V473, P273 HCAPLUS
- (7) Lindeberg, J; Food Chem 1996, V55, P73 HCAPLUS
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- (10) Recio, I; Electrophoresis 1995, V16, P654 HCAPLUS
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- (17) Weinbrenner, W; J Chromatogr 1994, V662, P414 HCAPLUS

L86 ANSWER 7 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1998:590212 HCAPLUS

DN 129:313776

TI Samples of human .alpha.-lactalbumin, inducing

- apoptosis of transformed cells, containing **ribooligonucleotides**
- AU Kit, Yu. Ya.; Kuligina, E. V.; Romannikova, I. V.; Semenov, D. V.;  
Rikhter, V. A.; Vlasov, V. V.
- CS Novosibirsk. Inst. Bioorg. Khim., Sib. Otd. Ross. Akad. Nauk, Novosibirsk,  
Russia
- SO Doklady Akademii Nauk (1998), 360(3), 406-408  
CODEN: DAKNEQ; ISSN: 0869-5652
- PB MAIK Nauka
- DT Journal
- LA Russian
- CC 13-1 (Mammalian Biochemistry)  
Section cross-reference(s): 6, 18
- AB **Oligonucleotides** of different sizes were found in samples of  
human **.alpha.-lactalbumin** "Sigma" and in human milk  
caseins contg. **.alpha.-lactalbumin**. Large  
**oligonucleotides** can be hydrolyzed by RNAase A and sepd. from **.  
.alpha.-lactalbumin** by ion-exchange  
**chromatog.** The influence of the **oligonucleotides** on the  
formation of **multimeric** forms of **.alpha.-  
lactalbumin** and on cytotoxic activity of human milk is discussed.
- ST **alpha lactalbumin oligonucleotide** casein  
human milk
- IT Milk  
(human; samples of human **.alpha.-lactalbumin**,  
inducing apoptosis of transformed cells, contg.  
**ribooligonucleotides**)
- IT **Oligonucleotides**  
RL: BOC (Biological occurrence); BPR (Biological process); BSU (Biological  
study, unclassified); PUR (Purification or recovery); BIOL (Biological  
study); OCCU (Occurrence); PREP (Preparation); PROC (Process)  
(samples of human **.alpha.-lactalbumin**, inducing  
apoptosis of transformed cells, contg. **ribooligonucleotides**)
- IT Caseins, properties  
RL: PRP (Properties)  
(samples of human **.alpha.-lactalbumin**, inducing  
apoptosis of transformed cells, contg. **ribooligonucleotides**)
- IT **Lactalbumins**  
RL: BPR (Biological process); BSU (Biological study, unclassified); PRP  
(Properties); PUR (Purification or recovery); BIOL (Biological study);  
**PREP (Preparation)**; PROC (Process)  
(**.alpha.-**; samples of human **.alpha.-  
lactalbumin**, inducing apoptosis of transformed cells, contg.  
**ribooligonucleotides**)
- L86 ANSWER 8 OF 21 HCAPLUS COPYRIGHT 2003 ACS
- AN 1998:585149 HCAPLUS
- DN 129:342863
- TI Extraction of **.alpha.-lactalbumin** from whey protein  
concentrate with modified inorganic membranes
- AU Lucas, David; Rabiller-Baudry, Murielle; Millesime, Luc; Chaufer, Bernard;  
Daufin, Georges
- CS Laboratoire des Procédés de Séparation, UA Université de Rennes 1-INRA,  
Rennes, 35000, Fr.
- SO Journal of Membrane Science (1998), 148(1), 1-12  
CODEN: JMESDO; ISSN: 0376-7388
- PB Elsevier Science B.V.
- DT Journal
- LA English
- CC 17-8 (Food and Feed Chemistry)
- AB A study was made to ext. **.alpha.-lactalbumin** (**.  
alpha.-LA**) selectively from acid casein whey protein conc. (WPC)  
at pH 7 by limiting **.beta.-lactoglobulin** (**.beta.-LG**) transmission. In  
order to achieve a high selectivity (ratio of **.alpha.-LA**

transmission/.beta.-LG transmission), inorg. membranes were chem. modified by a polyethyleneimine coating bearing pos. charges. In-depth study by anion-exchange chromatog. with a similar polymer coating suggests the possibility a more selective ion-exchange process with .beta.-LG by the membrane at low or moderate ionic strength. Accordingly, transmission was investigated vs. ionic strength (NaCl added): transmission of .beta.-lactoglobulin was lowered with the modified membrane (.alpha.-LA transmission about 10%) and selectivities close to 10, were achieved at low ionic strength ( $I < 0.02 \text{ mol L}^{-1}$ ) when unmodified membrane selectivities were about 3 whatever the mol.-wt. cut-off. High selectivity of the tailor-made membrane was due to the adjustment of mol. sieving combined with anion-exchange interactions between neg. charged .beta.-LG and the membrane, the reversible fouling of which was enhanced. Modification of the net charge of protein by specific adsorption of divalent ion such as calcium or phosphate increased or decreased the transmission of protein, resp., but the membrane selectivity was similar because the adsorption of divalent ion occurred on the two proteins.

ST lactalbumin extn whey protein ultrafiltration membrane

IT Anion exchange

Fouling

Ionic strength

Ultrafiltration

(extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT Adsorption

(ion; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT Ultrafilters

(polyethyleneimine; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT Proteins, specific or class

RL: FFD (Food or feed use); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)  
(whey; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT Lactalbumins

RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(.alpha.-; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT Lactoglobulins

RL: FFD (Food or feed use); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)  
(.beta.-; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT 7440-70-2, Calcium, processes 14265-44-2, Phosphate, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(adsorption; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT 9002-98-6

RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)  
(membrane coating; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

IT 1314-23-4, Zirconium oxide, biological studies

RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)  
(membrane; extn. of .alpha.-lactalbumin from whey protein conc. by using modified inorg. membranes)

RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

(1) Chaufer, B; J Chromatogr 1991, V548, P215 HCAPLUS

(2) Chaufer, B; Key Eng Mater 1991, V61(62), P249

- (3) Chaufer, B; Unpublished results
- (4) Dumon, S; J Membr Sci 1992, V74, P289 HCAPLUS
- (5) Eigel, W; J Dairy Sci 1984, V67, P1599 HCAPLUS
- (6) Ingham, K; Polymer Science and Technology 1980, V13, P141 HCAPLUS
- (7) Ko, M; J Membr Sci 1993, V76, P101 HCAPLUS
- (8) Kopaciewicz, W; J Chromatogr 1983, V266, P3 HCAPLUS
- (9) Le Berre, O; J Membr Sci 1994, V88, P263 HCAPLUS
- (10) Lemque, R; J Chromatogr 1991, V553, P165 HCAPLUS
- (11) Lucas, D; Colloids Surf A 1998, V136, P109 HCAPLUS
- (12) Mehra, R; J Dairy Res 1993, V60, P89 HCAPLUS
- (13) Millesime, L; Bioseparation 1996, V6, P135 HCAPLUS
- (14) Millesime, L; J Membr Sci 1995, V108, P143 HCAPLUS
- (15) Millesime, L; Langmuir 1996, V12, P3377 HCAPLUS
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- (17) Nakao, S; Desalination 1988, V70, P191 HCAPLUS
- (18) Patocka, G; Can Inst Sci Technol J 1991, V24, P218
- (19) Peters, T; Serum Albumin in Advances in Protein Chemistry 1985, P161 HCAPLUS
- (20) Rabiller-Baudry, M; J Chromatogr B 1998, V706, P23 HCAPLUS
- (21) Randon, J; Colloids Surf A 1991, V52, P241 HCAPLUS
- (22) Resmini, P; Sci E Technica Latterio-Casearia 1989, V40, P7
- (23) Ricq, L; Ph D Thesis, Université de Franche-Comte 1996
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- (26) Zhang, L; Desalination 1993, V90, P137 HCAPLUS

L86 ANSWER 9 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1998:392096 HCAPLUS

DN 129:25387

TI Sequential separation of whey proteins and formulations thereof

IN Ahmed, Salah H.; Saxena, Vinit; Mozaffar, Zahid; Miranda, Quirinus R.

PA Sepragen Corp., USA

SO U.S., 13 pp., Cont. of U. S. Ser. No. 177,574, abandoned.

CODEN: USXXAM

DT Patent

LA English

IC ICM C07K016-04

ICS C07K014-47; C07K001-36; A23C009-14

NCL 530366000

CC 9-9 (Biochemical Methods)

Section cross-reference(s): 15, 17

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5756680	A	19980526	US 1996-678364	19960716 <--
	US 6096870	A	20000801	US 1998-76169	19980504 <--
PRAI	US 1994-177574	B1	19940105	<--	
	US 1996-678364	A2	19960716	<--	

AB A method is disclosed for the sequential sepn. of whey proteins using radial-flow chromatog. Different buffer systems adjusted to suitable pH and ionic strength are utilized in the sepn. process. The method separates at least five different proteins, e.g lactoferrin, Ig, lactoglobulin, **lactalbumin** and bovine serum albumin, from whey. Infant feeding formulas, and other food formulations are also disclosed incorporating therein in different proportions various proteins sepd. from the whey.

ST whey protein radial flow chromatog column; infant formula lactoferrin Ig lactoglobulin **lactalbumin**

IT Immunoglobulins

RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)

(G; sequential sepn. of whey proteins and formulations thereof)

IT Albumins, biological studies

RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(bovine serum; sequential sepn. of whey proteins and formulations thereof)

- IT Milk  
(cow or human; sequential sepn. of whey proteins and formulations thereof)
- IT Milk substitutes  
(human; sequential sepn. of whey proteins and formulations thereof)
- IT Caseins, biological studies  
RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)  
(hydrolyzates; sequential sepn. of whey proteins and formulations thereof)
- IT Dairy products  
(nonfat milk solid; sequential sepn. of whey proteins and formulations thereof)
- IT Buffers  
**Cation exchangers**  
Liquid chromatography  
(sequential sepn. of whey proteins and formulations thereof)
- IT Carbohydrates, biological studies  
Fats and Glyceridic oils, biological studies  
Minerals, biological studies  
Vitamins  
RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)  
(sequential sepn. of whey proteins and formulations thereof)
- IT Immunoglobulins  
**Lactalbumins**  
Lactoferrins  
Lactoglobulins  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
(sequential sepn. of whey proteins and formulations thereof)
- IT Proteins, specific or class  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); PREP (Preparation); USES (Uses)  
(whey; sequential sepn. of whey proteins and formulations thereof)
- IT **Lactalbumins**  
RL: FFD (Food or feed use); PUR (Purification or recovery); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
(.alpha.-; sequential sepn. of whey proteins and formulations thereof)
- IT **Lactalbumins**  
RL: REM (Removal or disposal); PROC (Process)  
(.beta.-; sequential sepn. of whey proteins and formulations thereof)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Burling; US 5149647 1992 HCAPLUS
- (2) Chaveron; US 4803089 1989 HCAPLUS
- (3) Derahm; US 4879131 1989 HCAPLUS
- (4) Girardet; Milchwissencharft 1989, V44(11), P692 HCAPLUS
- (5) Host; Allergy 1992, V47(3), P218 MEDLINE
- (6) Kakade; US 4614653 1986 HCAPLUS
- (7) Kulczjcki; US 5223281 1993
- (8) Kuwata; US 4834994 1989 HCAPLUS
- (9) Manji; J Dairy Sci 1985, V68, P3176 HCAPLUS
- (10) Saxena; US 4865729 1989 HCAPLUS
- (11) Thibault; US 5077067 1991 HCAPLUS
- (12) Uchida; US 5179197 1993

L86 ANSWER 10 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1998:73067 HCAPLUS

DN 128:189986

TI Bovine whey fractionation based on cation-exchange chromatography  
 AU Hahn, R.; Schulz, P. M.; Schaupp, C.; Jungbauer, A.  
 CS Forestry and Biotechnology, Institute of Applied Microbiology, University  
 of Agriculture, Muthgasse 18, Vienna, A-1190, Austria  
 SO Journal of Chromatography, A (1998), 795(2), 277-287  
 CODEN: JCRAEY; ISSN: 0021-9673  
 PB Elsevier Science B.V.  
 DT Journal  
 LA English  
 CC 9-3 (Biochemical Methods)  
 Section cross-reference(s): 17  
 AB Bovine whey proteins have potential applications in veterinary medicine,  
 food industry and as supplements for cell culture media. A fractionation  
 scheme for the economically interesting proteins, such as IgG, lactoferrin  
 and lactoperoxidase, based on cation exchangers was the goal of our  
 investigations. A chromatog. process was developed where **.alpha**  
**.-lactalbumin** passes through the column and sepn. of the desired  
 proteins is achieved. Four different cation-exchange media (S-HyperD-F,  
 S-Sepharose FF, Fractogel EMD SO3- 650 (S) and Macro-Prep High S Support)  
 were compared in regard to their dynamic binding capacity for IgG and  
 their different elution behaviors when sequential step gradients with NaCl  
 buffers were applied. Peak fractions were analyzed by size-exclusion  
 chromatog. and sodium dodecyl sulfate-polyacrylamide gel electrophoresis.  
 Lactoperoxidase activity was monitored by the oxidn. of  
 o-phenylenediamine. In order to explain the different resoln. behaviors,  
 isocratic runs with pure stds. of whey proteins were performed. The k'  
 values were calcd. and plotted against salt concn. Fractogel EMD had the  
 highest binding capacity for IgG, 3.7 mg/mL gel at a linear flow-rate of  
 100 cm/h, but the resoln. was low compared to that with the other three  
 media. S-Hyper D and S-Sepharose FF showed lower capacities, 3.3 and 3.2  
 mg/mL gel, resp., but exhibited better protein resoln. These effects  
 could be partially explained by the k' vs. salt concn. plots. The binding  
 capacity of Macro-Prep S was considerably lower compared to that of the  
 other resins investigated because its selectivity for whey proteins was  
 completely different. S-Sepharose FF and S-Hyper D combine relatively  
 high dynamic capacity for IgG and good resoln. Compared to studies with  
 std. proteins, such as 100 mg/mL bovine serum albumin for S-Hyper D, their  
 binding capacities were very low. Even after removal of low-mol.-mass  
 compds., the capacity could not be improved significantly. The running  
 conditions (low pH) were responsible for the low protein binding capacity,  
 since low-mol.-mass compds. in the feed do not compete with the adsorption  
 of whey protein. The dynamic capacity did not decrease to a large extent  
 within the range of flow-rates (100-600 cm/h) investigated. The dynamic  
 capacity of HyperD and Fractogel was at least five times higher when pure  
 bovine IgG was used for detn. In conclusion, S-Sepharose FF, S-Hyper D-F  
 and Fractogel EMD SO3- 650 (S) are considered as successful candidates for  
 the large-scale purifn. of bovine whey proteins.  
 ST whey protein purifn cation exchange chromatog  
 IT Immunoglobulins  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (G; bovine whey fractionation based on cation-exchange chromatog.)  
 IT **Cation exchange chromatography**  
 Whey  
 (bovine whey fractionation based on cation-exchange chromatog.)  
 IT Lactoferrins  
 Proteins, general, preparation  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (bovine whey fractionation based on cation-exchange chromatog.)  
 IT Proteins, specific or class  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (whey; bovine whey fractionation based on cation-exchange chromatog.)  
 IT **Lactalbumins**  
 RL: PUR (Purification or recovery); PREP (Preparation)

- (.alpha.-; bovine whey fractionation based on cation-exchange chromatog.)
- IT Lactoglobulins  
RL: PUR (Purification or recovery); PREP (Preparation)  
(.beta.-; bovine whey fractionation based on cation-exchange chromatog.)
- IT 129186-25-0, Fractogel EMD 133976-91-7, Sepharose FF 188039-62-5, Macro-Prep High S 189303-29-5, HyperD  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(bovine whey fractionation based on cation-exchange chromatog.)
- IT 9003-99-0P, Lactoperoxidase  
RL: PUR (Purification or recovery); PREP (Preparation)  
(bovine whey fractionation based on cation-exchange chromatog.)
- L86 ANSWER 11 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1997:43849 HCAPLUS  
DN 126:117185  
TI Whey proteins extraction by fluidized **ion exchange chromatography**: simplified modeling and economical optimization  
AU Carrere, H.; Bascoul, A.; Floquet, P.; Wilhelm, A. M.; Delmas, H.  
CS Laboratoire de Genie Chimique, Unite de Recherche CNRS 5503, ENSIGC, 18 chemin de la Loge, Toulouse, 31078, Fr.  
SO Chemical Engineering Journal (Lausanne) (1996), 64(3), 307-317  
CODEN: CMEJAJ; ISSN: 0300-9467  
PB Elsevier  
DT Journal  
LA English  
CC 17-2 (Food and Feed Chemistry)  
AB A study was made of sweet whey protein (.alpha.-lactalbumin and .beta.-lactoglobulin) recovery by a fluidized **ion exchange chromatog.** process. Simplified models are proposed for both main steps of this cyclic process: a model with intraparticle diffusion for the adsorption of proteins (fixation step) and a lumped kinetic model for their desorption (elution step). The validity of these models and their phys. background are discussed. They are then used for an economical optimization algorithm in order to det. operating conditions (duration of fixation and elution steps, elution effluent recycling and liq.-phase velocity). Recycling the elution effluents leads to a slight improvement in the process but it was found to be less advantageous than an optimization of the liq.-phase velocity.
- ST whey protein extn **ion exchange chromatog**  
IT Simulation and Modeling, physicochemical  
(of whey protein extn. by fluidized **ion exchange chromatog.**)
- IT **Ion exchange chromatography**  
(preparative fluidized; modeling of whey protein extn. by fluidized **ion exchange chromatog.**)
- IT Proteins, specific or class  
RL: PUR (Purification or recovery); PREP (Preparation)  
(whey; modeling of whey protein extn. by fluidized **ion exchange chromatog.**)
- IT **Lactalbumins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(.alpha.-; modeling of whey protein extn. by fluidized **ion exchange chromatog.**)
- IT Lactoglobulins  
RL: PUR (Purification or recovery); PREP (Preparation)  
(.beta.-; modeling of whey protein extn. by fluidized **ion exchange chromatog.**)
- L86 ANSWER 12 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1996:574639 HCAPLUS  
DN 125:219927

TI Fractionation of proteins from whey with different pilot scale processes  
AU Outinen, M.; Tossavainen, O.; Tupasela, T.; Koskela, P.; Koskinen, H.;  
Rantamaki, P.; Syvaaja, E.-L.; Antila, P.; Kankare, V.  
CS R&D Cent., Valio Ltd., Helsinki, FIN-00101, Finland  
SO Food Science & Technology (London) (1996), 29(5 & 6), 411-417  
CODEN: LBWTAP; ISSN: 0023-6438  
PB Academic  
DT Journal  
LA English  
CC 17-2 (Food and Feed Chemistry)  
Section cross-reference(s): 6  
AB Pilot scale prodn. of **.alpha.-lactalbumin** (**.alpha.-La**) and **.beta.-lactoglobulin** (**.beta.-Lg**) from sweet and acid casein wheys using two heat pptn. and two chromatog. methods was studied. Using the heat pptn. methods, the sol. **.beta.-Lg** was recovered easily by ultrafiltration, but the recovery of the low d. **.alpha.-La** ppt. was difficult. In addn., with acid casein whey, significant denaturation of **.alpha.-La** occurred. **.beta.-Lg** was selectively removed from acid casein whey with strongly basic silica and polystyrene anion exchange resin columns by elution with 0.1 mol/L HCl or 0.33 mol/L NaCl soln. **.beta.-Lg** eluted with HCl was highly denatured.  
ST protein fractionation whey pilot scale process; **lactalbumin** fractionation whey pilot scale process; **lactoglobulin** fractionation whey pilot scale process  
IT Whey  
(fractionation of proteins from whey with different pilot scale processes)  
IT **Chromatography, column and liquid**  
(**ion-exchange**, fractionation of proteins from whey with different pilot scale processes)  
IT Filtration  
(ultra-, fractionation of proteins from whey with different pilot scale processes)  
IT **Lactalbumins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(**.alpha.-**, fractionation of proteins from whey with different pilot scale processes)  
IT **Lactoglobulins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(**.beta.-**, fractionation of proteins from whey with different pilot scale processes)  
IT **7647-01-0**, Hydrochloric acid, biological studies **7647-14-5**, Sodium chloride, biological studies  
RL: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)  
(fractionation of proteins from whey with different pilot scale processes)  
IT **7647-01-0**, Hydrochloric acid, biological studies **7647-14-5**, Sodium chloride, biological studies  
RL: BUU (Biological use, unclassified); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process); USES (Uses)  
(fractionation of proteins from whey with different pilot scale processes)  
RN 7647-01-0 HCAPLUS  
CN Hydrochloric acid (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)  
  
HCl  
  
RN 7647-14-5 HCAPLUS  
CN Sodium chloride (NaCl) (9CI) (CA INDEX NAME)

Cl-Na

L86 ANSWER 13 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1996:340682 HCAPLUS

DN 125:1356

TI Antibacterial composition containing multimeric **.alpha.-lactalbumin**

IN Sabharwal, Hemant; Svanborg, Catharina

PA Swed.

SO PCT Int. Appl., 34 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM A61K038-38

ICS A61K035-20

CC 1-5 (Pharmacology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9604929	A1	19960222	WO 1994-SE742	19940816
W: AU, BR, CA, CZ, FI, HU, JP, KR, NO, NZ, PL, RU, SK, US				
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
CA 2197659	AA	19960222	CA 1994-2197659	19940816
AU 9477922	A1	19960307	AU 1994-77922	19940816
EP 776214	A1	19970604	EP 1994-928519	19940816
EP 776214	B1	19990728		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, NL, PT, SE				
JP 10504547	T2	19980506	JP 1994-507224	19940816
AT 182470	E	19990815	AT 1994-928519	19940816
ES 2136206	T3	19991116	ES 1994-928519	19940816
PRAI EP 1994-928519		19940816		
WO 1994-SE742		19940816		

*Consolidated*

AB A multimeric **.alpha.-lactalbumin** (I) is sepd from milk and used in the therapeutic or prophylactic treatment and/or for diagnostic use for infections, preferably of the respiratory tract, caused by bacteria, in particular *S. pneumoniae* and/or *H. influenzae*. Antiadhesive and bactericidal **.alpha.-lactalbumin** was purified from human breast milk by fractionation of casein by ion exchange chromatog. and fractionation of the pool eluting after 1M NaCl by gel **chromatog.** Antibiotic-resistant *Streptococcus pneumoniae* was incubated with 10 mg/mL I for 0.5 h then it was inoculated onto growth plate. There was no viable counts as compared with  $1 \times 10^6$  for the untreated controls.

ST antibacterial compn **alpha lactalbumin** breast milk

IT Bactericides, Disinfectants, and Antiseptics

*Haemophilus influenzae**Streptococcus pneumoniae*(antibacterial compn. contg. multimeric **alpha-lactalbumin**)

IT Milk

(breast; antibacterial compn. contg. multimeric **alpha-lactalbumin**)IT **Lactalbumins**

RL: BAC (Biological activity or effector, except adverse); BOC (Biological occurrence); BSU (Biological study, unclassified); THU (Therapeutic use); BIOL (Biological study); OCCU (Occurrence); USES (Uses)

(**.alpha.-**, antibacterial compn. contg. multimeric **alpha-lactalbumin**)

L86 ANSWER 14 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1996:322517 HCAPLUS  
DN 125:84961  
TI Recovery of whey proteins in a fluidized bed: effect of solid-phase mixing  
AU Mourad, M.; Bascoul, A.; Delmas, H.; Wilhelm, A. M.; Gros, B.  
CS Lab. Genie Chimique, ENSIGC, Toulouse, 31078, Fr.  
SO Recents Progres en Genie des Procedes (1995), 9(42, Genie des  
Procetes Complexes), 483-488  
CODEN: RPGPEX; ISSN: 1166-7478  
PB Tec & Doc - Lavoisier  
DT Journal  
LA French  
CC 17-2 (Food and Feed Chemistry)  
AB A model was developed for recovery of **.alpha.-lactalbumin** and **.beta.-lactoglobulin** from whey by **ion-exchange chromatog.** in a fluidized bed. The model is based on two compartments; in the first, solid and liq. phases flow cocurrently; there is countercurrent flow in the second compartment. Simulations of the effect of bed height indicated that above a value of 7 cm the fixation of proteins occurs in three steps and solid-phase mixing has a controlling influence on adsorption.  
ST whey protein recovery fluidized bed model; **ion exchange chromatog** whey protein  
IT Fluidized beds and systems  
Simulation and Modeling, biological  
Whey  
(recovery of whey proteins in fluidized beds in relation to solid-phase mixing)  
IT **Lactalbumins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(**.alpha.-**, recovery of whey proteins in fluidized beds in relation to solid-phase mixing)  
IT **Lactoglobulins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(**.beta.-**, recovery of whey proteins in fluidized beds in relation to solid-phase mixing)  
  
L86 ANSWER 15 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1996:199189 HCAPLUS  
DN 124:287502  
TI Preparative **ion exchange chromatography** of protein from dairy whey (lactose)  
AU Gerberding, Steven Jay  
CS Univ. of Tennessee, Knoxville, TN, USA  
SO (1996) 227 pp. Avail.: Univ. Microfilms Int., Order No. DA9609291  
From: Diss. Abstr. Int., B 1996, 56(11), 6257  
DT Dissertation  
LA English  
CC 17-8 (Food and Feed Chemistry)  
AB Unavailable  
ST whey protein chromatog  
IT Whey  
(preparative **ion exchange chromatog.** of protein from dairy whey)  
IT Albumins, preparation  
Proteins, preparation  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(preparative **ion exchange chromatog.** of protein from dairy whey)  
IT Immunoglobulins  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(G, preparative **ion exchange chromatog.**

- of protein from dairy whey)
- IT **Chromatography, column and liquid**  
(ion-exchange, preparative ion  
exchange chromatog. of protein from dairy whey)
- IT **Lactalbumins**  
RL: PUR (Purification or recovery); PREP (Preparation)  
(.alpha.-, preparative ion exchange  
chromatog. of protein from dairy whey)
- IT **Lactoglobulins**  
RL: PUR (Purification or recovery); PREP (Preparation)  
(.beta.-, preparative ion exchange  
chromatog. of protein from dairy whey)
- L86 ANSWER 16 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1995:892334 HCAPLUS  
DN 123:312543  
TI Quantitative chromatographic separation of milk proteins  
AU Franzen, Maike; Pabst, K.; Schulte-Coerne, H.; Gravert, H. O.  
CS Bundesanstalt Milchwissenschaft, Kiel, 24103, Germany  
SO Milchwissenschaft (1995), 50(9), 483-8  
CODEN: MILCAD; ISSN: 0026-3788  
PB VV-GmbH Volkswirtschaftlicher Verlag  
DT Journal  
LA German  
CC 17-8 (Food and Feed Chemistry)  
Section cross-reference(s): 13
- AB Samples of milk were taken from 778 black pied cows and 368 cows of the  
Angler breed during the period from Jan. to May, 1990, and analyzed  
concerning their protein fraction contents by means of HPLC. The protein  
fraction contents varied considerably between cows. They depended on the  
herd level, the stage of lactation and the cows' age as well. The high  
performance ion-exchange chromatog. of the  
major bovine milk proteins is an alternative method to electrophoresis  
with densitometry for the qual. and quant. anal. of milk proteins. The  
successful sepn. and identification of whey proteins and caseins showed us  
that with this method complex biol. systems could be analyzed.
- ST milk protein purifn sepn HPLC
- IT Milk  
Senescence  
Whey  
(quant. chromatog. sepn. of and factors affecting milk proteins)
- IT Albumins, biological studies  
Caseins, biological studies  
Immunoglobulins  
Proteins, biological studies  
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR  
(Purification or recovery); BIOL (Biological study); OCCU (Occurrence);  
PREP (Preparation)  
(quant. chromatog. sepn. of and factors affecting milk proteins)
- IT Lactation  
(stage; quant. chromatog. sepn. of and factors affecting milk proteins)
- IT Chromatography, column and liquid  
(high-performance, quant. chromatog. sepn. of and factors affecting  
milk proteins)
- IT Caseins, biological studies  
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR  
(Purification or recovery); BIOL (Biological study); OCCU (Occurrence);  
PREP (Preparation)  
(.kappa.-, quant. chromatog. sepn. of and factors affecting milk  
proteins)
- IT **Lactalbumins**  
RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR  
(Purification or recovery); BIOL (Biological study); OCCU (Occurrence);

**PREP (Preparation)**

(.alpha.-, quant. chromatog. sepn. of and factors affecting milk proteins)

IT Caseins, biological studies

RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR (Purification or recovery); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation)

(.alpha.s-, quant. chromatog. sepn. of and factors affecting milk proteins)

IT Caseins, biological studies

Lactoglobulins

RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR (Purification or recovery); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation)

(.beta.-, quant. chromatog. sepn. of and factors affecting milk proteins)

IT Caseins, biological studies

RL: BOC (Biological occurrence); BSU (Biological study, unclassified); PUR (Purification or recovery); BIOL (Biological study); OCCU (Occurrence); PREP (Preparation)

(.gamma.-, quant. chromatog. sepn. of and factors affecting milk proteins)

L86 ANSWER 17 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1993:100823 HCAPLUS

DN 118:100823

TI Manufacture of composition with high **alpha-lactalbumin** content from whey

IN Shimatani, Masaharu; Uchida, Yukio; Matsuno, Ichirou; Sugawara, Makihiro; Nakano, Taku

PA Snow Brand Milk Products Co., Ltd., Japan

SO Fr. Demande, 13 pp.

CODEN: FRXXBL

DT Patent

LA French

IC ICM A23C021-00

ICS A23C009-146

ICA A61K037-02

CC 17-8 (Food and Feed Chemistry)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2671697	A1	19920724	FR 1992-545	19920120 <--
	FR 2671697	B1	20010727		
	JP 04330252	A2	19921118	JP 1991-19114	19910121 <--
	JP 2961625	B2	19991012		
	AU 650719	B2	19940630	AU 1992-11301	19920227 <--
	AU 9211301	A1	19930909		
	US 5434250	A	19950718	US 1994-231984	19940421 <--
PRAI	JP 1991-19114	A	19910121		<--
	US 1992-820369	B1	19920114		<--

AB A method for prepg. an **alpha-lactalbumin** conc.

comprises (a) adjusting the pH of whey obtained from cheese or casein manuf. to .gtoreq.5; (b) contacting the whey with an ion exchanger; (c) adjusting the pH of soln. obtained from the ion exchanger treatment to .ltoreq.4; and (d) concg. or desalting the soln. The soln. from step b may be concd. and the lactose removed by crystn. In step d, the soln. is subjected to ultrafiltration. Using this procedure, 100 kg of whey was processed to produce 8 kg soln. contg. 4.2 g **alpha-lactalbumin**/100 g soln. This soln. was concd. and dried to obtain 0.90 kg powder.

ST **lactalbumin alpha** whey ion exchanger

IT **Anion exchangers**

**Cation exchangers**

(in .alpha.-lactalbumin manuf. from whey, pH in relation to)

- IT Whey  
 (.alpha.-lactalbumin conc. manuf. from, with ion exchangers, pH in relation to)
- IT Filtration  
 (ultra-, in .alpha.-lactalbumin manuf. from whey, pH in relation to)
- IT Lactalbumins  
 RL: PREP (Preparation)  
 (.alpha.-, prepn. of, from whey, with ion exchangers, pH in relation to)
- IT 144746-90-7, Indion S 3 145018-76-4, Sepharosil MAQ  
 RL: BIOL (Biological study)  
 (in .alpha.-lactalbumin conc. prepn. from whey, pH in relation to)
- IT 63-42-3, Lactose  
 RL: REM (Removal or disposal); PROC (Process)  
 (removal of, from treated whey, for prepn. of .alpha.-lactalbumin conc.)

L86 ANSWER 18 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1990:196885 HCAPLUS

DN 112:196885

TI Method for fractionating proteins of human milk leading to the production particularly of lactoferrin and (alpha)-lactalbumin, and products obtained

IN Maynard, Francoise; Pierre, Alice; Maubois, Jean Louis

PA Institut National de la Recherche Agronomique, Fr.

SO PCT Int. Appl., 32 pp.

CODEN: PIXXD2

DT Patent

LA French

IC ICM A23J001-20

ICS A23C009-142; A61K035-20; A61K037-02

CC 17-6 (Food and Feed Chemistry)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 8911226	A1	19891130	WO 1989-FR255	19890526 <--
	W: AU, DK, JP, NO, US				
	RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE				
	FR 2631785	A1	19891201	FR 1988-7122	19880527 <--
	AU 8937493	A1	19891212	AU 1989-37493	19890526 <--
PRAI	FR 1988-7122		19880527 <--		
	WO 1989-FR255		19890526 <--		

AB Human milk proteins are fractionated at <48.degree. to produce lactoferrin, .alpha.-lactalbumin, and other products by microfiltration with a membrane of pore size .apprx.0.2 .mu.m, ultrafiltration with an 80,000-300,000 (preferably .apprx.100,000) daltons threshold mol. wt., and then further ultrafiltration (threshold mol. wt. preferably 10,000). With addnl. diafiltration, plus ion exchange chromatog., the lactalbumin of the retentate after the 1st ultrafiltration is purified (with removal of minor amts. of serum albumin by this process). Diafiltration of the retentate after the 2nd ultrafiltration step purifies the .alpha.-lactalbumin. The products may be used as therapeutic or dietetic dietary constituents for humans or animals.

ST milk protein fractionation lactalbumin lactoferrin

IT Feed

(dietetic and therapeutic, .alpha.-lactalbumin and lactoferrin from human milk purifn. for)

IT Proteins, biological studies  
RL: BIOL (Biological study)  
(of human milk, fractionation of)

IT Albumins, biological studies  
Lactoferrins  
RL: PUR (Purification or recovery); PREP (Preparation)  
(purifn. of, from human milk proteins by microfiltration and ultrafiltration)

IT Food  
(dietetic, lactoferrin and .alpha.-lactalbumin from human milk purifn. for)

IT Milk  
(human, proteins of, fractionation of)

IT Filtration  
(micro-, of milk proteins of humans, lactoferrin and .alpha.-lactalbumin fractionation and purifn. by)

IT Food  
(therapeutic, lactoferrin and .alpha.-lactalbumin from human milk purifn. for)

IT Filtration  
(ultra-, of milk proteins of humans, lactoferrin and .alpha.-lactalbumin fractionation and purifn. by)

IT Lactalbumins  
RL: PUR (Purification or recovery); PREP (Preparation)  
(.alpha.-, purifn. of, from human milk proteins by microfiltration and ultrafiltration)

L86 ANSWER 19 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1982:404926 HCAPLUS  
DN 97:4926  
TI Animal or vegetable protein preparation, specifically lactoproteins and their products  
IN Arnaud, Michel; Chambon, Michel; Edon, Andre; Guillet, Nicole; Malige, Bernard  
PA Fromageries Bel S. A., Fr.  
SO Fr. Demande, 12 pp.  
CODEN: FRXXBL  
DT Patent  
LA French  
IC A23J001-20; A23J003-00  
ICA A23C009-00; A23C019-00; A23K001-08  
CC 17-8 (Food and Feed Chemistry)  
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2452881	A1	19801031	FR 1979-8555	19790404 <--
	FR 2452881	B1	19831125		
	FR 2487642	A2	19820205	FR 1980-16970	19800731 <--
	FR 2487642	B2	19851018		
PRAI	FR 1979-8555		19790404	<--	

AB Proteins with properties of interest in the food industry are prepd. by ion-exchange and exclusion chromatog. from raw materials (esp. whey, milk, and buttermilk) subjected to physicochem. pretreatments. Among the products that can be obtained are .alpha.-lactalbumin for use in human milk substitutes, fractions rich in SH groups for use in bakery products, and milk without serum proteins for use in cheese manuf. Thus, sweet whey was concd. and brought to pH 6.5 with NH4OH. The soln. was cooled to .apprx.5.degree., then percolated through 3 columns arranged in the series: anionic, cationic, then anionic column. From the 1st column .beta.-lactoglobulin, from the 2nd globulins, and from the 3rd .alpha.-lactalbumins were isolated.

ST protein sepn milk chromatog; ion exchange protein milk; whey protein sepn chromatog

- IT Milk  
Whey  
(proteins of, chromatog. sepn. of, for food manuf.)
- IT **Lactalbumins**  
Lactoglobulins  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(purifn. of, for food manuf.)
- IT **Lactalbumins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(.alpha.-, purifn. of, for food manuf.)
- L86 ANSWER 20 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1980:127014 HCAPLUS  
DN 92:127014  
TI Purification of whey proteins for quantitative electrophoresis  
AU Reimerdes, E. H.; Mehrens, H. A.; Matthiesen, Inge  
CS Bundesanst. Milchwirtsch., Inst. Chem. Phys., Kiel, Fed. Rep. Ger.  
SO Kieler Milchwirtschaftliche Forschungsberichte (1979), 31(3),  
223-37  
CODEN: KMWFAF; ISSN: 0023-1347  
DT Journal  
LA German  
CC 17-1 (Foods)  
Section cross-reference(s): 9
- AB .beta.-Lactoglobulins A and B, .alpha.-lactalbumin,  
and serum albumin were isolated from whey obtained from skim milk by pptg.  
casein with HCl at pH 4.6, dialyzing 12-15 h, and freeze drying the whey  
protein. The albumins were sepd. by anion exchange on a DEAE-cellulose DE  
52 column with pH 7.2 Tris-HCl buffers in a Tris gradient of 0.01-0.25 N.  
Protein-contg. eluate fractions were dialyzed and freeze dried for addn.  
fractionation on a Sephadex G-100 with a pH 6.1 buffer contg. 0.1N  
Tris-HCl and 1M NaCl. Lactoglobulins were sepd. by salt pptn. followed by  
**ion exchange** or gel **chromatog.** Thus, 264 g  
(NH4)2SO4 was added slowly to 1 L fresh raw milk at 20.degree. with  
stirring, fat and casein were removed by centrifuging at 1200 g for 30  
min, and the whey was filtered and preserved with PhMe. The pH was  
adjusted to 3.5 with 1N HCl to obtain an .alpha.-  
**lactalbumin**-rich fraction by centrifugation (14,000 g for 40 min).  
The supernatant was filtered, adjusted to pH 6 with 1N NH4OH, 264 g/L  
(NH4)2SO4 added, and a lactoglobulin-rich fraction was obtained by  
centrifuging. This fraction was desalted by chromatog. on a column of  
Sephadex G-15, eluting with H2O or on Ultrogel Aca 44 mol. sieve, eluting  
with 0.2% NaCl for fractionation. The protein-contg. eluate fractions  
were dialyzed and freeze dried. Polyacrylamide gel electrophoresis was  
used to control the fractionations.
- ST whey protein fractionation; **lactalbumin** purifn; lactoglobulin  
purifn; serum albumin purifn
- IT Whey  
(proteins of, fractionation and purifn. of)
- IT Albumins, blood serum  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(purifn. of, from whey)
- IT **Lactalbumins**  
RL: PUR (Purification or recovery); **PREP (Preparation)**  
(.alpha.-, purifn. of, from whey)
- IT Lactoglobulins  
RL: BIOL (Biological study)  
(.beta.-, A and B, purifn. of, from whey)
- L86 ANSWER 21 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1973:109368 HCAPLUS  
DN 78:109368  
TI Simple procedures for the separation and identification of bovine milk

whey proteins

AU Cervone, Felice; Diaz Brito, Joaquin; Di Prisco, Guido; Garofano, Felice; Gutierrez Norona, Lilliam; Traniello, Serena; Zito, Romano

CS Sch. Pharm. Biochem., Univ. La Habana, Havana, Cuba

SO Biochimica et Biophysica Acta (1973), 295(2), 555-63

CODEN: BBACAQ; ISSN: 0006-3002

DT Journal

LA English

CC 17-1 (Foods)

Section cross-reference(s): 9

AB A simple procedure, **ion-exchange** column **chromatog.** on DEAE-cellulose, is described, which allows complete sepn. of the major components of bovine milk whey. Electrophoretically pure **.alpha.-lactalbumin B**, **.beta.-lactoglobulin A**, and **.beta.-lactoglobulin B** are eluted with a linear concn. gradient at const. pH; serum albumin is eluted in another peak, but is assocd. with another whey protein. The fractionation can be achieved also on a preparative scale, starting either from (NH4)2SO4 whey or neutralized acid whey; prior concn. is unnecessary. Rapid electrophoretic techniques, which permit identification of whey proteins, as well as simultaneous anal. of whey from a large no. of individual animals, in 40-90 min, are also described.

ST milk whey protein chromatog; electrophoresis whey protein

IT Milk analysis  
(protein sepn. in)

IT Whey  
(proteins of, prepn. of)

IT Proteins  
RL: PROC (Process)  
(sepn. of, of whey)

IT **Lactalbumins**  
RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(**.alpha.-**, B, prepn. of)

IT **Lactoglobulins**  
RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(**.beta.-**, A and B, prepn. of)

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FILE 'WPIX' ENTERED AT 12:35:49 ON 27 MAR 2003  
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FILE LAST UPDATED: 24 MAR 2003 <20030324/UP>  
MOST RECENT DERWENT UPDATE: 200320 <200320/DW>  
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[http://www.derwent.com/userguides/dwpi\\_guide.html](http://www.derwent.com/userguides/dwpi_guide.html) <<<

=> d all abeq tech abex tot

L114 ANSWER 1 OF 17 WPIX (C) 2003 THOMSON DERWENT  
 AN 2000-578416 [54] WPIX  
 DNC C2000-172153  
 TI Novel methods for separation of whey proteins, useful as nutritional supplements, comprising passing whey through cationic and anionic columns.  
 DC A96 B04 D13  
 IN AHMED, S H; MIRANDA, Q R; MOZAFFAR, Z; SAXENA, V  
 PA (SEPR-N) SEPRAGEN CORP  
 CYC 1  
 PI US 6096870 A 20000801 (200054)\* 47p C07K016-04  
 ADT US 6096870 A Cont of US 1994-177574 19940105, CIP of US 1996-678364 19960716, US 1998-76169 19980504  
 FDT US 6096870 A CIP of US 5756680  
 PRAI US 1998-76169 19980504; US 1994-177574 19940105; US 1996-678364 19960716  
 IC ICM C07K016-04  
 ICS A23C009-12; C07K014-47  
 AB US 6096870 A UPAB: 20001027

NOVELTY - Sequential separation of whey proteins (I), comprising passing a whey sample comprising immunoglobulins, beta -lactoglobulin, **alpha** -lactalbumin, lactoperoxidase, serum albumin and/or lactoferrin through a cationic exchange resin, collecting the flow-through, and (sequentially) eluting the immunoglobulins, beta -lactoglobulin, **alpha** -lactalbumin, serum albumin, lactoferrin and lactoperoxidase from the resin.

DETAILED DESCRIPTION - Sequential separation of whey proteins (I), comprising passing a whey sample comprising immunoglobulins, beta -lactoglobulin, **alpha** -lactalbumin, lactoperoxidase, serum albumin and/or lactoferrin through a cationic exchange resin under adsorbent conditions, collecting the flow-through (comprising lactose, minerals, lactic acid, and non-nitrogenous components), and (sequentially) eluting the immunoglobulins, beta -lactoglobulin, **alpha** -lactalbumin, serum albumin, lactoferrin and lactoperoxidase from the resin.

INDEPENDENT CLAIMS are also included for the following:

(1) a 2-column method for the separation of whey proteins comprising passing a whey sample through an anionic exchange resin, collecting the flow-through (containing immunoglobulins, **alpha** -lactalbumin, lactoperoxidase, serum albumin and/or lactoferrin) and eluting beta -lactoglobulin from the resin, passing the flow-through through an ultrafiltration membrane, passing the ultrafiltrate through a cation exchange resin and sequentially eluting immunoglobulins, **alpha** -lactalbumin, serum albumin and lactoferrin from the resin;

(2) processing whey comprising passing a whey sample through a cation exchange resin and collecting the deproteinized whey flow-through;

(3) production of a clear whey protein isolate comprising passing a whey sample through a cation exchange resin, and sequentially eluting the whey proteins adsorbed onto the resin, and serum albumin and fat from the resin;

(4) production of an **alpha** -lactalbumin-enriched whey protein isolate comprising passing whey through an anion exchange resin under conditions that promote the binding of beta -lactalbumin but not **alpha** -lactalbumin; and

(5) cleaning a resin contained within a chromatography column comprising washing the resin with sodium hypochlorite and sequentially exposing the washed resin to sodium hydroxide, hydrochloric acid and ethanol.

USE - The method is used to produce a clear whey protein product. The formula produced from (1) is useful as a nutritional formula in sports drinks, fruit gels, ice cream and cookies, and/or as an infant food. The infant food is non-allergenic (all claimed). The whey products may also be

used for the production of cheese.

DESCRIPTION OF DRAWING(S) - The diagram shows the basic steps in the cheese making process.

Dwg.1/13

FS CPI

FA AB; GI; DCN

MC CPI: A12-M; A12-W11; B04-B04K; B04-L03B; B04-N02; B11-B; D03-B02; D03-B06; D03-F01; D03-H01T2

TECH UPTX: 20001027

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Methods: In the method of (1), the steps of eluting **alpha**-lactalbumin, lactoperoxidase, serum albumin and lactoferrin utilize a buffer. The method of (1) further comprises the step of cleaning the 2 resins with a cleaning buffer. The method of (2) further comprises an anion exchange resin and the steps of passing the deproteinized (processed) whey through the anion exchange resin, and eluting the remaining proteins and optionally washing the whey proteins to produce a clear whey isolate. The whey proteins adsorbed onto the cation exchange resin are eluted. The cation exchange resin is washed to produce a wash buffer. The whey protein isolate of (3) comprises immunoglobulins, beta-lactoglobulin, **alpha**-lactalbumin. Adsorbed whey proteins are eluted using a clear whey protein isolate buffer. Serum albumin and lipoproteins are eluted using a serum albumin buffer. The method further comprises ultrafiltering the clear whey protein isolate and diafiltering the ultrafiltrate. In the method of (4) beta-lactoglobulin is eluted from the anion resin. The method of (5) further comprises equilibrating the cleansed resin. The washed resin is rinsed with water prior to washing with sodium hypochlorite. The base-treated resin is rinsed with water prior to exposing to hydrochloric acid. The acid treated resin is rinsed with water prior to ethanol exposure. The method further comprises passing whey enriched in **alpha**-lactalbumin through a cation exchange resin.

Preferred Whey: The whey is pasteurized sweet whey, pasteurized acid whey, non-pasteurized acid whey, and/or whey protein concentrate. The flow through comprises a formula comprising at least 1 whey protein. The method further comprises diafiltering the formula. The whey isolate is freeze dried, frozen or is spray dried (to form a powder).

Preferred Container: The container comprises a radial flow column, an axial flow column, or is a beaker, tank, vat or chamber.

Preferred Resin: The cationic exchange resin comprises a cellulose matrix, a co-polymerized glycidyl methacrylate or a cross-linked diethylene glycol. The cationic exchange resin comprises cross-linked flexible sponge absorbent. The cross-linked flexible sponge absorbent comprises substantially uniformly distributed fibrous reinforcement. In the method of (1) the 2 resins are independently reconditioned. In the method of (2) the cation exchange buffer is a weak acid cation exchange resin (preferably a carboxymethyl resin) and the anion exchange resin is a weak base anion exchange resin (preferably a dithylaminoethyl resin). The cation and anion exchange resins are reconditioned with buffers. The anion exchange resin is a radial or axial flow column.

Preferred Buffer: The buffer is selected from whey buffer, permeate and modified whey buffer. The buffer is recycled. The cleaning buffer comprises sodium hydroxide, sodium chloride and ethanol. The wash buffer of (2) comprises non-protein nitrogen. The cation and anion buffers comprise deproteinized whey. The anion buffer comprises lactose, minerals, lactic acid, and vitamins. The clear whey protein isolate buffer of (3) comprises sodium acetate and sodium chloride, the flow-through, (recycled) deproteinized whey or whey buffer. The serum albumin buffer comprises sodium chloride and sodium acetate or sodium citrate salt. Both buffers are recycled.

TI Economical process for isolating beta-lactoglobulin and **alpha-lactalbumin** in substantially purified state, in single contacting step, in one column, without use of salt for elution.

DC B04 D13

IN ETZEL, M R

PA (WISC) WISCONSIN ALUMNI RES FOUND

CYC 1

PI US 5986063 A 19991116 (200002)\* 16p C07K001-18

ADT US 5986063 A US 1998-126904 19980731

PRAI US 1998-126904 19980731

IC ICM C07K001-18

ICS A23J001-20; C07K014-435

AB US 5986063 A UPAB: 20000112

NOVELTY - A process for isolating beta -lactoglobulin and **alpha-lactalbumin** comprising eluting proteins bound to an ion exchanger using different pH values alone, is new.

DETAILED DESCRIPTION - The process comprises:

- (a) adjusting whey protein solution to pH of less than 4.5;
- (b) fractionating by contacting with cation exchanger to give bound fraction containing beta -lactoglobulin and **alpha-lactalbumin**;
- (c) adjusting bound fraction to pH of 4-6;
- (d) in absence of sodium chloride, eluting at pH of (c) to obtain substantially purified beta -lactoglobulin fraction and remaining fraction on cationic exchanger;
- (e) adjusting remaining bound fraction to pH of 6.5 or greater; and
- (f) in absence of sodium chloride, eluting at pH of (e) to obtain substantially purified **alpha-lactalbumin** fraction.

USE - The process is used to isolate beta -lactoglobulin (claimed), which is used as a gelling agent in hams, surimi and other foods, especially in Japan, and to isolate **alpha-lactalbumin** (claimed), which is used in preparation of humanized milk and compositions of non-allergenic milk for infants allergic to beta -lactoglobulin in cows' milk, as an important food ingredient and a stable emulsifier and foaming agent, e.g. in salad dressings and cake mixes.

ADVANTAGE - Single cation-exchange that produces both proteins in substantially purified state. Isolates both proteins, superior in terms of purity from solution containing whey proteins in single contacting step, in one column, without use of salt for elution. More economical for production of both proteins from single batch of whey.

Dwg.0/9

FS CPI

FA AB; DCN

MC CPI: B04-B04K; B04-N02; B11-C08D2; D03-B; D03-H01J; D03-H01N; D03-H01Q

TECH UPTX: 20000112

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred method: Cation exchanger comprises porous membranes containing charged immobilized groups. Process is conducted at 35-50 (about 40) degreesC. In (c), fraction bound to cation exchanger in (b) is adjusted to about pH 4.9. In (e), remaining fraction bound to cation exchanger from (d) is adjusted to about pH 6.5.

ABEX UPTX: 20000112

EXAMPLE - Water-jacketed **chromatography** column operated at 35 degreesC was packed with sulfopropyl cation exchanger (100 ml). Mozzarella cheese whey was adjusted to pH 3.0 using 1M phosphoric acid and 500 ml was pumped into the column in upflow at flow rate of 8 ml/minute. Ion exchanger was washed with water (180 ml) to remove contaminants, minerals, lactose and fat. Ion exchanger was washed with solution (385 ml) of 0.2M sodium citrate, 0.02M ethylene diaminetetra acetic acid (EDTA) tetra sodium salt, pH 3. beta-Lactoglobulin was eluted from ion exchanger using 0.2M sodium citrate (1,280 ml; pH 4.9). **alpha-lactalbumin** was eluted from ion exchanger using 0.2M sodium citrate, 0.05M calcium chloride (930 ml; pH 6.5).

L114 ANSWER 3 OF 17 WPIX (C) 2003 THOMSON DERWENT  
 AN 1999-371026 [31] WPIX  
 DNC C1999-109521  
 TI An agent for transporting **alpha-lactalbumin** into cancer cells.  
 DC B04 D16 K08  
 IN **HAKANSSON, P A; SVANBORG, C**  
 PA (HAKA-I) HAKANSSON P A; (SVAN-I) SVANBORG C  
 CYC 83  
 PI WO 9927967 A1 19990610 (199931)\* EN 48p A61K047-48  
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL  
 OA PT SD SE SZ UG ZW  
 W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE  
 GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG  
 MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG  
 US UZ VN YU ZW  
 AU 9911710 A 19990616 (199945)  
 EP 1032426 A1 20000906 (200044) EN A61K047-48  
 R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE  
 JP 2001524535 W 20011204 (200203) 48p A61K047-48  
 ADT WO 9927967 A1 WO 1998-IB1920 19981123; AU 9911710 A AU 1999-11710  
 19981123; EP 1032426 A1 EP 1998-954689 19981123, WO 1998-IB1920 19981123;  
 JP 2001524535 W WO 1998-IB1920 19981123, JP 2000-522952 19981123  
 FDT AU 9911710 A Based on WO 9927967; EP 1032426 A1 Based on WO 9927967; JP  
 2001524535 W Based on WO 9927967  
 PRAI GB 1997-25126 19971127  
 IC ICM A61K047-48  
 ICS A61K009-06; A61K009-08; A61K038-00; A61K039-44; A61K047-42;  
 A61K051-00; A61K051-08; A61P035-00  
 AB WO 9927967 A UPAB: 19990806  
 NOVELTY - An agent (A) comprising a protein complex comprising an oligomeric form of **alpha-lactalbumin** (MAL) and a further reagent (I), which is combined with MAL such that it is carried into the nucleoplasm of cells which are susceptible to MAL.  
 DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:  
 (1) a method of treating cancer which comprises administering to cancer cells, a pharmaceutical composition (A) comprising a carrier or excipient; and  
 (2) a method of diagnosing cancer which method comprises applying to cells which are suspected of being cancerous, (A) and observing penetration of the agent into the nucleus of these cells.  
 USE - (A) is used in the treatment or in vitro diagnosis of cancer (claimed).  
 Dwg.0/0  
 FS CPI  
 FA AB; DCN  
 MC CPI: B04-N02; B12-K04; B14-H01; D05-H09; D05-H11A; K08-X; K09-B  
 TECH UPTX: 19990806  
 TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred materials: (I) is coupled to MAL by conjugation or by covalent bonding. (I) covalently bonded to MAL by way of a linking or spacer group. (I) comprises a polypeptide or protein which is fused to MAL. (I) is selected from cytotoxin, a microbial toxin or an antibody, especially a monoclonal antibody. (I) comprises a labeling agent selected from biotin or a radioactive label, e.g. 125I, 14C or 15S.  
 ABEX UPTX: 19990806  
 ADMINISTRATION - (A) is made into a solution or cream for topical use. Alternatively, (A) is adapted for oral administration.  
 EXAMPLE - To detect intracellular protein, the L1210, A549 and HRTEC cells were fixed at various times after addition of 0.3 mg/ml of biotinylated MAL for 5 minutes in phosphate-buffered para formaldehyde (4%) at room temperature, washed in phosphate buffered saline (PBS), and permeabilized with 0.1% saponin in PBS. FITC conjugated streptavidin (diluted 1:100 in

0.1% saponin) was added and the cells were incubated for 30 minutes at room temperature.

The cells were washed twice in PBS saponin and once in PBS, mounted on a glass slide and analyzed in a Bio-Rad 1024 laser scanning confocal equipment attached to a Nikon Diaphot inverted microscope.

Permeabilization with the saponin allowed entry of streptavidin. Cells treated with medium, biotinylated BSA or  $\alpha$ -lactalbumin served as controls. Nuclear uptake of MAL was shown to occur rapidly in cells that were sensitive to its apoptosis-inducing effects. Nuclear staining of L1210 cells was first detected after about 2 hours in about 10% of the cells, and after 6 hours more than 70% of L1210 cell nuclei stained brightly. Cytoplasmic staining was not observed in those cells. Nuclear localization of MAL in the A549 cells required longer incubation times. About 15% of A549 cell nuclei stained brightly. In the meantime, MAL was observed in the cytoplasm of A549 cells as granular fluorescence evenly distributed throughout the cell. Nuclear uptake was not observed in the HRTEC cells exposed to the biotinylated MAL (1mg/ml). There was a marked difference in the nuclear uptake of ALA compared to MAL. Nuclear staining of ALA was only detected in circa. 30% of L1210 cells after 6 hours and in about 15% of A549 cells after 24 hours. No staining of ALA was detected in the HRTEC cells.

L114 ANSWER 4 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1999-357815 [30] WPIX

DNC C1999-105891

TI Production of oligomeric **alpha-lactalbumin** useful for inducing apoptosis in tumor cells.

DC B04 D16

IN HAKANSSON, P A; SVANBORG, C; SVENSSON, M W

PA (HAKA-I) HAKANSSON P A; (SVAN-I) SVANBORG C; (SVEN-I) SVENSSON M W

CYC 83

PI WO 9926979 A1 19990603 (199930)\* EN 48p C07K014-76 <--

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL  
OA PT SD SE SZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE  
GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG  
MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG  
US UZ VN YU ZW

AU 9912541 A 19990615 (199944)

EP 1032596 A1 20000906 (200044) EN C07K014-76 <--

R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

JP 2001524491 W 20011204 (200203) 53p C07K014-76 <--

ADT WO 9926979 A1 WO 1998-IB1919 19981123; AU 9912541 A AU 1999-12541.  
19981123; EP 1032596 A1 EP 1998-955823 19981123, WO 1998-IB1919 19981123;  
JP 2001524491 W WO 1998-IB1919 19981123, JP 2000-522135 19981123

FDT AU 9912541 A Based on WO 9926979; EP 1032596 A1 Based on WO 9926979; JP  
2001524491 W Based on WO 9926979

PRAI GB 1998-12202 19980605; GB 1997-24725 19971121

IC ICM C07K014-76

ICS A61K038-00; A61K038-38; A61P031-04; A61P035-00; B01D015-04;  
B01D015-08; B01J041-04

AB WO 9926979 A UPAB: 19990802

NOVELTY - A new method (M1) of producing a biologically active oligomeric form of **alpha-lactalbumin** (aLA) comprises oligomerising and stabilizing aLA in the molten globule-like state.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a method for producing an oligomeric form of aLA which comprises exposing a source of aLA to an ion exchange medium which has been pre-treated with casein or an active component and recovering aLA in an oligomeric form;

(2) an ion exchange medium for use in the above methods, where the medium has been treated with casein or its active components;

(3) an ion exchange column comprising the ion exchange medium of (2);  
and

(4) an oligomeric form of aLA obtained by a method as in (M1) or (1).

USE - The oligomeric aLA is able to induce apoptosis in tumor cells and/or has a bactericidal effect not seen with monomeric aLA.

Dwg.0/8

FS CPI

FA AB; DCN

MC CPI: B04-C03D; B04-N02; B14-A01; B14-H01; D05-H17A6

TECH UPTX: 19990802

TECHNOLOGY FOCUS - BIOTECHNOLOGY - Preferred Method: The aLA in a molten globule-like state is applied to an anion exchange column which contains a conversion reagent e.g. a component of casein or oleic acid. The column has been eluted with the conversion reagent. The aLA may be subjected to a pretreatment with a calcium chelating agent, e.g. EDTA and low pH, e.g. using HCl, in order to maximize the amount of molten globule-like material. The pre-treatment step comprises heating the aLA to a temperature in excess of from 25-120 degrees Centigrade, preferably 70 degrees Centigrade. The aLA is applied to the column together with a reagent which will induce it to form the molten globule-like state. The molten globule-like inducing reagent is a calcium chelating agent, such as EDTA, present in the elution buffer. The conversion reagent comprises a fatty acid (e.g. oleic acid) or a lipid which is a component of casein. aLA is a mutated form of the native protein in which the calcium binding sites are modified. Particularly the cysteine residues of the aLA are mutated.

In the method of (2), the active component is oleic acid in substantially pure form. The ion exchange medium has been treated with caesin derived from human milk, or caesin which has been previously frozen or is derived from frozen milk. The calcium chelating agent is contacted with aLA prior to contact with the ion exchange medium. The calcium chelating agent is added to an elution buffer which is then used to effect the contact between the aLA and the ion exchange medium. The ion exchange medium comprises EDTA trisacryl. The ion exchange column is eluted with casein or its active components in an ion exchange buffer such as Tris-HCL, followed by elution with a source of aLA (such as monomeric bovine or human aLA) dissolved in the ion exchange buffer in the presence of a salt gradient. The column is washed by elution with the ion exchange buffer twice.

ABEX UPTX: 19990802

EXAMPLE - Oligomeric alpha-lactalbumin (aLA) was prepared using DEAE Trisacryl M and the buffers A: 10mM Tris-HCl pH 8.5, and B: 10mM Tris-HCl with 1M NaCl pH 8.5. 300mg of casein derived from human milk was run on a fresh unused ion exchange matrix. The matrix was then washed with 2 runs of buffer A. Untreated monomeric human aLA (8mg) was added to the column.

2 multimeric peaks were found. 4 further samples were run down this column and all gave 2 multimeric peaks. The 2 peaks which are believed to contain monomeric aLA were kept separately and tested individually using L1210 tumor cells. The results showed that peaks 1 and 2 at 1mg/ml reduced the viability of the tumor cells.

L114 ANSWER 5 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1999-254553 [21] WPIX

DNC C1999-074445

TI Continuous chromatographic sequential separation of whey proteins.

DC B04 D13

IN AHMED, S H; MIRANDA, Q; SAXENA, V

PA (SEPR-N) SEPRAGEN CORP

CYC 23

PI WO 9915024 A1 19990401 (199921)\* EN 37p A23C009-14

RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: AU CA JP KR NZ

AU 9745893 A 19990412 (199934)  
 EP 1017286 A1 20000712 (200036) EN A23C009-14  
 R: AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE  
 KR 2001030665 A 20010416 (200163) A23C009-14  
 JP 2001516599 W 20011002 (200172) 35p A23C009-14  
 NZ 503566 A 20021025 (200274) A23C009-14

ADT WO 9915024 A1 WO 1997-US16993 19970922; AU 9745893 A AU  
 1997-45893 19970922, WO 1997-US16993 19970922; EP 1017286  
 A1 EP 1997-944384 19970922, WO 1997-US16993 19970922;  
 KR 2001030665 A WO 1997-US16993 19970922, KR 2000-703033  
 20000322; JP 2001516599 W WO 1997-US16993 19970922, JP  
 2000-512418 19970922; NZ 503566 A NZ 1997-503566 19970922,  
 WO 1997-US16993 19970922

FDT AU 9745893 A Based on WO 9915024; EP 1017286 A1 Based on WO 9915024; JP  
 2001516599 W Based on WO 9915024; NZ 503566 A Based on WO 9915024

PRAI WO 1997-US16993 19970922

IC ICM A23C009-14  
 ICS A23C009-152; A23L001-305; C07K001-16

AB WO 9915024 A UPAB: 19990603  
 NOVELTY - Continuous **chromatographic** sequential separation of  
 whey proteins comprises adsorbing liquid whey on a separation medium  
 packed in a **chromatographic** column and sequentially eluting  
 immunoglobulin, beta -lactoglobulin, **alpha -lactalbumin**  
 , bovine serum albumin and lactoferrin fractions.  
 DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the  
 following:  
 (1) an infant formula containing at least 25% lactoferrin and less  
 than 0.5 % beta -lactoglobulin;  
 (2) an infant formula comprising approx. a-lactalbumin,  
 lactoferrin, immunoglobulin and bovine serum albumin and  
 (3) a fat substitute comprising 60% approx. b-lactoglobulin and 40%  
 approx. a-lactalbumin.  
 USE - Used for producing infant formula (claimed) and dietary and  
 pharmaceutical formulations.  
 ADVANTAGE - The method sequentially and completely separates whey  
 proteins in a one or two step process without denaturation.  
 Dwg.0/3

FS CPI  
 FA AB; DCN  
 MC CPI: B04-N02; B14-E11; B14-E12; D03-H01T2  
 TECH UPTX: 19990603

TECHNOLOGY FOCUS - BIOLOGY - Preferred process: The liquid whey comprises  
 pasteurized sweet whey, pasteurized or non pasteurized acid whey or whey  
 protein concentrate.  
 The separation medium is a cationic resin. The sequentially eluted  
 immunoglobulin, beta-lactoglobulin, **alpha-lactalbumin**,  
 bovine serum albumin and lactoferrin are further purified by  
 diafiltration.  
 The separation comprises:  
 (1) packing a **chromatographic** column with a cationic exchange  
 resin to form a packed **chromatographic** column;  
 (2) equilibrating the packed **chromatographic** column;  
 (3) passing a whey sample through the packed **chromatographic**  
 column to adsorb the whey proteins to the packed column;  
 (4) collecting the flow through from the packed column where the flow  
 comprises lactose, minerals, lactic acid and non-nitrogenous components;  
 (5) sequentially eluting the immunoglobulin and beta-lactoglobulin from  
 the packed **chromatographic** column;  
 (6) eluting **alpha-lactalbumin** from the packed column;  
 (7) reconditioning the packed **chromatographic** column;  
 (8) eluting bovine serum albumin and  
 (9) eluting lactoferrin from the column.  
 Separating beta-lactoglobulin from whey proteins comprises packing a

**chromatographic** column with an anionic exchange resin, equilibrating it, passing a whey sample through the column to adsorb beta-lactoglobulin, collecting the flow-through comprising **alpha-lactalbumin**, immunoglobulin, bovine serum albumin and lactoferrin and eluting the adsorbed beta-lactoglobulin from the column with a buffer to produce eluate.

The method also comprises packing a second **chromatographic** column with a cationic exchange resin, equilibrating it, passing the flow through through a 10000 molecular weight cut off ultrafiltration membrane to produce an ultrafiltrate, passing the ultrafiltrate through the second column to adsorb immunoglobulin, **alpha-lactalbumin**, bovine serum albumin and lactoferrin, eluting the immunoglobulin from the column followed by **alpha-lactalbumin**, reconditioning the column and eluting the bovine serum albumin followed by lactoferrin. The flow-through is combined with the eluate to produce a fat substitute.

TECHNOLOGY FOCUS - FOOD - Preferred Formula: The flow through comprises an infant formula. The infant formula further comprises casein hydrolysate, fat, nonfat milk solids, carbohydrate, minerals and vitamins, vegetable solids and/or sweeteners.

ABEX

UPTX: 19990603

EXAMPLE - Commercially whey as a by-product of mozzarella cheese manufacture was clarified to remove casein fines, centrifuged to remove milk fat residue, pasteurized at 162degreesF for 18 seconds and chilled to 40degreesF by passing it through HTST plate heat exchangers. 1 l Of the obtained skimmed commercial sweet whey at pH 6.4 and 6.2% total solids was pH adjusted to 3.8 with acetic acid at 40degreesF. The whey product comprised (in %): total solids (6.2); lactose (4.5); protein (0.8); fat (0.08); ash (0.77) and lactic acid (0.05).

The whey was passed through a 250 ml radial flow **chromatographic** column prepacked with a strong S cation exchange resin and equilibrated with 0.05 M acetate buffer at pH 3.8. All the whey proteins were bound to the resin matrix and the effluent containing non-protein components including lactose, minerals, lactic acid and non-protein nitrogenous components were passed through. The resin with the bound proteins was then washed with 0.05 M acetate buffer at pH 3.8. Immunoglobulin and beta-lactoglobulin were eluted with a buffer at pH 4.0 containing 0.1 M sodium acetate and 0.5 M sodium chloride.

The column was reconditioned and equilibrated with 0.05 M acetate buffer at pH 4.0. **alpha-Lactalbumin** fraction was eluted with a pH 5.0 buffer containing 0.1 M sodium acetate and 0.1 M sodium chloride.

The column was again reconditioned with a pH 5.0 buffer containing 0.05M sodium acetate. Bovine serum albumin was then eluted with a 0.05 M phosphate buffer at pH 7.0 followed by elution of lactoferrin at pH 7.5 with a buffer containing 0.05 M sodium phosphate and 0.5 M sodium chloride.

The column was regenerated by washing it with a solution containing 0.2 M sodium hydroxide and 1 M sodium chloride followed by washing with 20% ethanol solution to sterilize the column and equilibrate with acetate buffer at pH 3.8 for reuse.

L114 ANSWER 6 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1998-414731 [36] WPIX

DNC C1998-125238

TI Treating cancer comprises administering multimeric **alpha-lactalbumin** - by injection or as controlled release implant, without adverse effects on lymphoid cells.

DC B04

IN HAKANSSON, A; SABHARWAL, H; SVANBORG, C

PA (HAKA-I) HAKANSSON A; (SABH-I) SABHARWAL H; (SVAN-I) SVANBORG C

CYC 1

PI CA 2188903 A 19980425 (199836)\* EN 34p A61K038-38 &lt;--

ADT CA 2188903 A CA 1996-2188903 19961025

PRAI CA 1996-2188903 19961025

IC ICM A61K038-38

AB CA 2188903 A UPAB: 19980911

Treatment of cancer in a mammal comprises administration of multimeric **alpha -lactalbumin** (MLA). Also claimed are: (a) a sterile aqueous solution of MLA; (b) a sterile injectable composition for use in the treatment of cancer in mammals, comprising MLA in a pharmaceutical diluent; (c) extracorporeal treatment of human body fluids, by adding sufficient MLA to kill all of any cancer cells in the fluid; (d) a composition comprising an extracorporeal human body fluid containing sufficient MLA to kill all of any cancer cells in the fluid; (e) the use of MLA in the preparation of a sterile injectable composition for use in cancer therapy; and (f) a sterile composition comprising a solid containing MLA for insertion into a mammalian body to act as a controlled release source of MLA.

USE - MLA is an anticancer agent which induces apoptosis in transformed cells. It is active against cancers in low differentiated cells such as epithelial cells (e.g. lung, bronchial, kidney, bladder, mammary and small intestinal cells) and non-epithelial cells such as fibroblast cells (connective tissue).

ADVANTAGE - Any adverse effects of MLA on lymphoid cells are acceptably low in in vivo tests.

Dwg: 0/4

FS CPI

FA AB

MC CPI: B04-B04L; B04-N02; B12-M10; B14-H01

L114 ANSWER 7 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1998-321630 [28] WPIX

DNC C1998-098922

TI Process for sequential **chromatographic** separation of whey proteins - using radial flow **chromatography**, for use in e.g. infant feeding formulas.

DC B04 D13

IN AHMED, S H; MIRANDA, Q R; MOZAFFAR, Z; SAXENA, V

PA (SEPR-N) SEPRAGEN CORP

CYC 1

PI US 5756680 A 19980526 (199828)\* 13p C07K016-04 <--

ADT US 5756680 A Cont of US 1994-177574 19940105, US

1996-678364 19960716

PRAI US 1994-177574 19940105; US 1996-678364 19960716

IC ICM C07K016-04

ICS A23C009-14; C07K001-36; C07K014-47

AB US 5756680 A UPAB: 19980715

A process of continuous sequential separation of whey proteins (i.e. lactoferrin (LF), immunoglobulin (IgG), lactoglobulin (Lg), - **lactalbumin** (La) and bovine serum albumin (BSA)) comprises passing the liquid whey through a **chromatographic** column packed with cationic **ion exchange** resin, and sequentially eluting the proteins with suitable buffers, reconditioning the column as necessary, to obtain IgG and Lg, then La, then BSA, then LF. Also claimed is a method of separating Lg from whey proteins comprising: (1) passing the whey sample through a radial flow **chromatographic** column packed with an ionic **exchange** resin, where Lg is adsorbed; (2) collecting the permeate comprising other proteins (listed above); (3) eluting Lg with buffer; (4) passing the permeate from (3) through an ultrafiltration membrane, and (5) passing the ultrafiltrate through a second **chromatographic** column, from which the proteins can be sequentially eluted as described above.

USE - Proteins can be separated from pasteurised sweet whey, pasteurised or non-pasteurised acid whey, and whey protein concentrate. The separated proteins are used in pharmaceutical and dietary formulations, particularly infant feeding formulas (see 'Preferred

Compositions').

Dwg.0/3

FS CPI

FA AB

MC CPI: B04-N02; B11-B; B14-E11; D03-F01; D03-F04; D03-F05; D03-F06;  
D03-H01T2

L114 ANSWER 8 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1998-008482 [01] WPIX

DNC C1998-002948

TI Separating a soluble milk component from milk - by tangential flow  
filtration to produce permeate containing the component and using capture  
device for the component.

DC B04 D13

IN HAYES, M L; KUTZKO, J P; SHERMAN, L T

PA (GENZ) GENZYME TRANSGENICS CORP

CYC 23

PI WO 9742835 A1 19971120 (199801)\* EN 29p A23J001-20 <--

RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: AU CA JP NZ US

AU 9729402 A 19971205 (199814) A23J001-20 <--

EP 923308 A1 19990623 (199929) EN A23J001-20

R: AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

NZ 332916 A 20000526 (200033) A23J001-20

JP 2000510701 W 20000822 (200045) 33p C12N015-09

AU 725993 B 20001026 (200059) A23J001-20

US 6268487 B1 20010731 (200146) C07K001-14

EP 923308 B1 20020918 (200269) EN A23J001-20

R: AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

DE 69715641 E 20021024 (200278) A23J001-20

ADT WO 9742835 A1 WO 1997-US8044 19970513; AU 9729402 A AU

1997-29402 19970513; EP 923308 A1 EP 1997-923643 19970513,

WO 1997-US8044 19970513; NZ 332916 A NZ 1997-332916

19970513, WO 1997-US8044 19970513; JP 2000510701 W JP

1997-541036 19970513, WO 1997-US8044 19970513; AU 725993 B

AU 1997-29402 19970513; US 6268487 B1 US 1996-648235

19960513; EP 923308 B1 EP 1997-923643 19970513, WO

1997-US8044 19970513; DE 69715641 E DE 1997-615641 19970513

, EP 1997-923643 19970513, WO 1997-US8044 19970513

FDT AU 9729402 A Based on WO 9742835; EP 923308 A1 Based on WO 9742835; NZ

332916 A Based on WO 9742835; JP 2000510701 W Based on WO 9742835; AU

725993 B Previous Publ. AU 9729402, Based on WO 9742835; EP 923308 B1

Based on WO 9742835; DE 69715641 E Based on EP 923308, Based on WO 9742835

PRAI US 1996-648235 19960513

IC ICM A23J001-20; C07K001-14; C12N015-09

ICS A01K067-027; A23C009-142; A23C009-146; C07K001-16; C07K001-18;

C07K001-22; C12N005-10

AB WO 9742835 A UPAB: 19980107

Separation of a soluble milk component (SMC) from milk or a milk fraction,  
comprises: (a) subjecting the milk or milk fraction to tangential flow  
filtration across a membrane of sufficient porosity to form a retentate  
and a permeate comprising the SMC; (b) subjecting the permeate to a  
capture device to remove the SMC; (c) combining the effluent from the  
capture device in step (b) with the original milk sample, and (d)  
repeating steps (a)-(c) until the SMC is recovered.

The tangential flow filter has a pore size 0.1-1000 nm. The milk may  
be combined with a chelating agent, e.g. EDTA, EGTA or citrate added to a  
final concentration 1-500 mM. The capture device may be an affinity  
**chromatography** capture device, such as a heparin column, a Protein  
A column or a Protein G column. It is especially an **ion**  
**exchange chromatography** capture device. The milk is  
obtained from a lactating non-human mammal selected from the group  
comprising transgenic mammals and transomic mammals.

USE - The method can be used for the separation of SMCs such as glycoproteins, immunoglobulins, peptides, hormones, enzymes, serum proteins, milk proteins, cellular proteins, soluble receptors and industrial enzymes. In particular they can be used for separation of erythropoietin, **alpha**-1 proteinase inhibitor, alkaline phosphatase, angiogenin, antithrombin III, chitinase, extracellular superoxide dismutase, Factor VIII, Factor IX, Factor X, fibrinogen, glucocerebrosidase, glutamate decarboxylase, human serum albumin, insulin, myelin basic protein, lactoferrin, lactoglobulin, lysozyme, **lactalbumin**, proinsulin, soluble CD4, component and complexes of soluble CD4 or tissue plasminogen activator. The method substantially removes bacteria, mycoplasma, viruses, prion particles and other microbial contaminants present in the raw milk.

ADVANTAGE - The method can provide for the isolation of SMCs in a biologically active form without prior processing to remove fats, lipids, casein micelles or particular matter.

Dwg.0/4

FS CPI

FA AB; DCN

MC CPI: B04-B04K; B11-B; D03-B

L114 ANSWER 9 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1996-139457 [14] WPIX

DNC C1996-043792

TI Multi-meric **alpha-lactalbumin** used therapeutically or prophylactically - to treat bacterial infections of the respiratory tract, specifically of *S. pneumoniae* or *H. influenzae*.

DC B04

IN SABHARWAL, H; SVANBORG, C

PA (SABH-I) SABHARWAL H; (SVAN-I) SVANBORG C

CYC 32

PI WO 9604929 A1 19960222 (199614)\* EN 31p A61K038-38 <--

RW: AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE

W: AU BR CA CZ FI HU JP KR NO NZ PL RU SK US

AU 9477922 A 19960307 (199624) A61K038-38 <--

EP 776214 A1 19970604 (199727) EN A61K038-38 <--

R: AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT SE

JP 10504547 W 19980506 (199828) 35p A61K038-00

EP 776214 B1 19990728 (199934) EN A61K038-38 <--

R: AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT SE

DE 69419782 E 19990902 (199942) A61K038-38 <--

ES 2136206 T3 19991116 (200001)# A61K038-38 <--

MX 9406245 A1 19990101 (200051)# C07K003-00

ADT WO 9604929 A1 WO 1994-SE742 19940816; AU 9477922 A AU 1994-77922 19940816, WO 1994-SE742 19940816; EP 776214 A1 EP 1994-928519 19940816, WO 1994-SE742 19940816; JP 10504547 W WO 1994-SE742 19940816, JP 1996-507224 19940816; EP 776214 B1 EP 1994-928519 19940816, WO 1994-SE742 19940816; DE 69419782 E DE 1994-619782 19940816, EP 1994-928519 19940816, WO 1994-SE742 19940816; ES 2136206 T3 EP 1994-928519 19940816; MX 9406245 A1 MX 1994-6245 19940816

FDT AU 9477922 A Based on WO 9604929; EP 776214 A1 Based on WO 9604929; JP 10504547 W Based on WO 9604929; EP 776214 B1 Based on WO 9604929; DE 69419782 E Based on EP 776214, Based on WO 9604929; ES 2136206 T3 Based on EP 776214

PRAI WO 1994-SE742 19940816; MX 1994-6245 19940816

REP 02Jnl.Ref; EP 22696; EP 339656; FR 2671697; US 5290571

IC ICM A61K038-00; A61K038-38; C07K003-00

ICS A23L003-3526; A61K035-20; G01N033-569

ICA C07K014-76

AB WO 9604929 A UPAB: 19960405

New use of a multimeric **alpha-lactalbumin** (L) in the prepn. of therapeutically and/or prophylactically active antibacterial preps. against bacteria, particularly *S. pneumoniae* and/or *H. influenzae*.

Also claimed are (i) the method of using (L) for prophylactic and therapeutic purposes, (ii) a method of preparing antibacterial preps. contg. (L).

USE - (L) may be used to treat or prevent infections, esp. in the gastrointestinal or respiratory tracts by *S. pneumoniae* and/or *H. influenzae* (claimed) such as otitis media by preventing adhesion and thus colonisation. (L) may be administered as a nasal spray, in tablet or capsule form in conjunction with a carrier, injection or liquid form for oral administration. The nasal spray could be used for prophylactic purposes. (L) may be added to feedstuffs or food (claimed) such as infant food or animal feedstuffs. It may also be used to diagnose infections caused by *S. pneumoniae* and/or *H. influenzae* by determining the degree of interaction between bacterium in a sample and (L).

ADVANTAGE - This new form of (L) could be used as a bactericide on *S. pneumoniae* resistant to antibiotics.

Dwg.0/4

FS CPI  
FA AB  
MC CPI: B04-N02; B12-K04A4; B14-A01; B14-K01

L114 ANSWER 10 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1995-307083 [40] WPIX

DNC C1995-136568

TI Prepn of milk, whey derived beta lacto-globulin and **alpha-lactalbumin**, etc - comprises adjusting milk whey pH, protein concn and salt concn, contracting with hydrophobic **chromatographic** resin and fractionating.

DC D13

PA (KYOD) KYODO NYUGYO KK

CYC 1

PI JP 07203863 A 19950808 (199540)\* 4p A23J001-20 <--

ADT JP 07203863 A JP 1994-14964 19940114

PRAI JP 1994-14964 19940114

IC ICM A23J001-20

ICS C07K001-20; C07K014-47

AB JP 07203863 A UPAB: 19951011

Prepn. of milk whey-derived beta-lactoglobulin, **alpha**-lactalbumin, and lactoferrin comprises (a) adjusting milk whey to pH 4.4-4.6, a protein concn. of 0.5-10%, and NaCl concn. of 1.0M, (B) contacting the milk whey with a hydrophobic **chromatographic** resin; and (c) fractionating the milk whey with 0.75 M NaCl and 40% (V/V) ethanol.

ADVANTAGE - The functional gp. of the hydrophobic **chromatographic** resin is a butyl or phenyl gp., and has improved acid resistance, base resistance, pressure resistance, and microorganism resistance, and is used at room temp. The method reduces prices for beta-lactoglobulin, **alpha-lactalbumin**, and lactoferrin as food ingredients. The final prod. has no nonreversible deterioration. The method efficiently produces each protein in a series of processes.

Dwg.0/3

FS CPI  
FA AB  
MC CPI: D03-B; D03-F01

L114 ANSWER 11 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1995-269223 [35] WPIX

DNC C1995-122031

TI Fractionating whey or whey protein soln. chromatographically - comprises clarifying soln. and removing glyco-macro-peptide(s), and passing soln. through chromatography column packed with anion exchange resin.

DC D13

IN ANTILA, P; HARJU, M; OUTINEN, M; TOSSAVAINEN, O

PA (VALI-N) VALIO OY; (VALI-N) VALIO LTD

CYC 7

PI WO 9519714 A1 19950727 (199535)\* EN 23p A23J001-20  
 FI 9400316 A 19950722 (199542) A23J001-20  
 AU 9514193 A 19950808 (199545) A23J001-20  
 FI 96090 B 19960131 (199609) A23J001-20  
 EP 757522 A1 19970212 (199712) EN A23J001-20

R: DE DK FR IE NL

ADT WO 9519714 A1 WO 1995-FI27 19950120; FI 9400316 A FI 1994-316 19940121; AU 9514193 A AU 1995-14193 19950120; FI 96090 B FI 1994-316 19940121; EP 757522 A1 EP 1995-905668 19950120, WO 1995-FI27 19950120

FDT AU 9514193 A Based on WO 9519714; FI 96090 B Previous Publ. FI 9400316; EP 757522 A1 Based on WO 9519714

PRAI FI 1994-316 19940121

REP 2.Jnl.Ref

IC ICM A23J001-20

ICS A23C009-146; A23C021-00; A23J003-08

AB WO 9519714 A UPAB: 19950905

Fractionating whey or whey protein soln. chromatographically into an **alpha**-lactalbumin and a beta-lactalbumin component comprises (a) clarifying a batch of whey or whey protein soln. and opt. removing glycomacropeptides from it ; (b) passing the soln. through a chromatography column packed with a strong polystyrene-based anion exchange resin and recovering the fraction leaving the column; (c) washing the column with deionised water, the wash water being combined with the above fraction to give the **alpha**-lactalbumin component; and (d) eluting the washed column with a weak aq. NaCl soln. and recovering the eluate as a beta-lactalbumin component. The resin has a pore size of 1000-2000angstrom and a pore vol. of 0.9 cm<sup>3</sup>/g and in which a quat. alkyl amine or alkyl alkanolamine gp. (esp. alkylalkanolamine gps.) are attached to a styrene-divinyl-benzene-polymer matrix. The resin has a particle dia. of 300-600 mum. Also claimed are the obtd. **alpha**- and beta-lactalbumin components.

USE - The **alpha**- and beta-lactalbumins are useful in infant food formulas and as protein component in food industry respectively, in clinical nutritive preps. and various prods. in the food industry.

ADVANTAGE - The process is useful for fractionating proteins from different types of whey. The resin used for the sepn. is cheaper than prior art resins. The process allows most of the beta-lactalbumins to be sepd. from native whey into a fraction free of other whey proteins at pH 6-7.

Dwg.1/2

FS CPI

FA AB; GI

MC CPI: D03-B; D03-F01

L114 ANSWER 12 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1994-210011 [26] WPIX

DNC C1994-095994

TI Prodn. of whey protein concentrate - enriched in **alpha**-lactalbumin and/or beta-lactoglobulin, by destabilising **lactalbumin** in whey protein product before fractionation.

DC D13

IN BRONTS, H; DE, WIT J N

PA (CAMP-N) CAMPINA MELKUNIE BV; (DWIT-I) DE WIT J N

CYC 22

PI EP 604684 A1 19940706 (199426)\* EN 14p A23J001-20 <--  
 R: AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE  
 AU 9352674 A 19940707 (199431) A23C009-146 <--  
 CA 2111668 A 19940624 (199433) A23J001-20 <--  
 NZ 250400 A 19950427 (199522) A23C021-00 <--  
 US 5420249 A 19950530 (199527) 12p C07K003-28 <--  
 JP 07123927 A 19950516 (199528) 9p A23J001-20 <--  
 AU 664934 B 19951207 (199605) A23C009-146 <--

EP 604684 B1 19970611 (199728) EN 14p A23J001-20 <--  
 R: AT CH DE DK FR GB GR IE IT LI NL SE  
 DE 69220374 E 19970717 (199734) A23J001-20 <--  
 ADT EP 604684 A1 EP 1992-204074 19921223; AU 9352674 A AU  
 1993-52674 19931223; CA 2111668 A CA 1993-2111668 19931216;  
 NZ 250400 A NZ 1993-250400 19931209; US 5420249 A US  
 1993-170497 19931220; JP 07123927 A JP 1993-354797 19931222  
 ; AU 664934 B AU 1993-52674 19931223; EP 604684 B1 EP  
 1992-204074 19921223; DE 69220374 E DE 1992-620374 19921223  
 , EP 1992-204074 19921223  
 FDT AU 664934 B Previous Publ. AU 9352674; DE 69220374 E Based on EP 604684  
 PRAI EP 1992-204074 19921223  
 REP EP 16292; EP 38732; FR 2345939; US 2595459; US 2765232; 3.Jnl.Ref  
 IC ICM A23C009-146; A23C021-00; A23J001-20; C07K003-28  
 ICS A23C009-14; A23J003-08; A23L001-305; A61K035-20; C07K001-14;  
 C07K003-12; C07K014-47; C07K015-06  
 ICA A61K038-16  
 AB EP 604684 A UPAB: 19940817  
 Prodn. of whey protein concentrate (A) comprises (1) incubating a soln. of  
 whey protein product (B) with a Ca-binding **ion-exchange**  
 resin in acid form to initiate destabilisation of (I); (2) adjusting pH of  
 the treated soln. to 4.3-4.8 (after sepn. from the resin); (3) incubating  
 at 10-50 deg.C to flocculate (I); (4) fractionating proteins in the soln.  
 phase at pH 4.3-4.8 to give separate fractions enriched in (I) and (II);  
 (5) increasing the pH of the (I)-enriched fraction to solubilise it; (6)  
 opt. increasing the pH of the (II)-enriched fraction to neutralise it.  
 Pref. (B) contains 0.7-15% protein, is defatted and has pH at least  
 5.  
 USE/ADVANTAGE - (A) is used in prodn. of humanised and non-allergenic  
 milk products. By pretreating (B) before fractionation, the (I):(II) ratio  
 can be improved and controlled (at any ratio 0.1-10) and minimal waste  
 streams are generated. (I) and (II) are recovered in undenatured form and  
 sepn. is not affected by entrapment of (II) in aggregates of (I).  
 Dwg.2/5  
 FS CPI  
 FA AB  
 MC CPI: D03-B07; D03-F01  
 ABEQ US 5420249 A UPAB: 19950712  
**Alpha-lactalbumin** and beta-lactoglobulins are  
 selectively fractionated to recover either protein-enriched whey protein  
 concentrate from an initial whey protein prod..  
 Process comprises (a) incubating a soln. contg. whey protein prod.  
 with a calcium-binding ionic exchange resin in acid form to initiate  
 instabilisation of **alpha-lactalbumin**; (b) adjusting to  
 pH4.3-4.8; (c) incubating at 10-50 deg.C to promote flocculation of  
**alpha-lactalbumin**; (d) fractionating proteins at  
 pH4.3-4.8 to form 2 fractions each enriched with corresp. protein; (e)  
 raising pH of the **alpha-lactalbumin** enriched fraction  
 to solubilise it; and (f) opt. raising the pH of the beta-lactoglobulin  
 enriched fraction to neutralise it.  
 USE/ADVANTAGE - The **alpha-lactalbumin** is useful  
 in non-allergenic infant milk products. Undenatured protein prods. contg.  
**alpha-lactalbumin** and beta-lactoglobulin are obtd. in  
 any desired ratio between 0.1-10.  
 Dwg.0/5  
 ABEQ EP 604684 B UPAB: 19970709  
 A process for the recovery of **alpha-lactalbumin** and/or  
 beta-lactoglobulin enriched whey protein concentrate from a whey protein  
 product, characterised by: a) incubating a solution comprising said whey  
 protein product with a calcium-binding ionic exchange resin in its acid  
 form to initiate the instabilisation of **alpha-**  
**lactalbumin**, b) adjusting the pH of the treated protein product  
 solution to a value between 4.3 and 4.8, after separation of said resin,

c) incubating said protein product solution at a temperature, between 10 and 50 deg. C to promote the flocculation of **alpha-lactalbumin**, d) fractioning the proteins in said protein product solution a pH 4.3-4.8, providing an **alpha-lactalbumin** enriched fraction and a beta-lactoglobulin enriched fraction. e) raising the pH of the **alpha-lactalbumin** enriched fraction sufficiently to solubilise the **alpha-lactalbumin** fraction, and f) optionally raising the pH of the beta-lactoglobulin enriched fraction sufficiently to neutralise the beta-lactoglobulin fraction.

Dwg.0/5

L114 ANSWER 13 OF 17 WPIX (C) 2003 THOMSON DERWENT  
 AN 1993-058722 [07] WPIX  
 TI **Ion-exchange** membrane for sepn. of charged proteins - provides prods. from biological fluids, e.g. antibodies, vitamin(s), hormones, enzymes, clotting factors, immunoglobulin(s), etc..  
 DC B04 C03 D13 D16  
 IN DIONYSIUS, D A; GRIEVE, P A; JAMES, E A; MITCHELL, I R; REGESTER, G O; SMITHERS, G W; SMITHERS, G  
 PA (CSIR) COMMONWEALTH SCI & IND RES ORG; (DAIR-N) DAIRY RES & DEV CORP; (QUEE-N) STATE QUEENSLAND DEPT PRIMARY IND  
 CYC 19  
 PI WO 9302098 A1 19930204 (199307)\* EN 58p C07K003-22 <--  
 RW: AT BE CH DE DK ES FR GB GR IT LU MC NL SE  
 W: AU JP US  
 AU 9223762 A 19930223 (199324) C07K003-22 <--  
 EP 595993 A1 19940511 (199419) EN C07K003-22 <--  
 R: AT BE CH DE DK ES FR GB GR IT LI LU MC NL SE  
 JP 07502016 W 19950302 (199517) C07K001-18 <--  
 NZ 243727 A 19950328 (199519) B01J047-12 <--  
 EP 595993 A4 19940817 (199533) C07K003-22 <--  
 ADT WO 9302098 A1 WO 1992-AU381 19920724; AU 9223762 A AU 1992-23762 19920724; EP 595993 A1 EP 1992-916550 19920724, WO 1992-AU381 19920724; JP 07502016 W WO 1992-AU381 19920724, JP 1993-502493 19920724; NZ 243727 A NZ 1992-243727 19920727; EP 595993 A4 EP 1992-916550  
 FDT AU 9223762 A Based on WO 9302098; EP 595993 A1 Based on WO 9302098; JP 07502016 W Based on WO 9302098  
 PRAI AU 1991-7436 19910725  
 REP 7.Jnl.Ref; AU 8827180; BE 901672; FR 2487642; FR 2613725; GB 2179947; WO 8910064; No-Citns.  
 IC ICM B01J047-12; C07K001-18; C07K003-22  
 ICS A23C009-146; A23J001-06; A23J001-20; B01D015-04; B01D061-00; C07K014-575; C07K015-06; C12N009-08  
 AB WO 9302098 A UPAB: 19931119  
 Process for sepn. of charged molecules from a fluid, comprising: (a) providing an **ion exchange** medium disposed on a porous membrane, pref. with pore size 0.1 to 1.2 microns; (b) passing the fluid through the membrane, so that the charged materials are preferentially adsorbed on the medium; and (c) eluting the adsorbed molecules; is new.  
 USE/ADVANTAGE - The process is partic. suitable for treatment of biological fluids, including milk or milk prods., blood or blood plasma, or fermentation or cell culture fluids, and large vols. can be effectively filtered in a single step operation to isolate minor charged components in good yield. The milk prods. include skim milk and whey, the latter considered usually a waste prod. in the dairy industry; also colostrum. Types of molecules which can be isolated include proteins, hormones, vitamins, enzymes, clotting factors, immunoglobulins, peptides,, lysozyme, and antibodies. From milk, lactoferrin, lactoperoxidase, growth promoting agents, glycomacropeptides lysozyme, and **alpha-lactalbumin**; and from blood, clotting factors, serum albumin and immunoglobulins, all prods. of value in both human and veterinary

medicine, are obtd. The effluent from the sepn. may also be of value; e.g. whey effluent, free of particulates and microorganisms, can be processed into a low-fat whey protein concentrate powder with high solubility after extn. of lactoferrin and lactoperoxidase. Use of the membrane avoids traditional **ion-exchange** column problems of swelling on packing, and maintenance is easier. Fat globules and proteinaceous aggregates which would clog traditional columns are prevented from passing through the porous membrane and are retained on the retentate side, as the pore size is sufficiently small. Elution of the charged molecules can take place either before removal of the aggregates or after (e.g. by means of a wash prior to elution of prods.)rea

Dwg. 1/24

FS CPI

FA AB; GI

MC CPI: B04-B02C2; C04-B02C2; B04-B04A6; C04-B04A6; B11-B; C11-B; D05-H13

L114 ANSWER 14 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1992-310264 [38] WPIX

DNC C1992-137760

TI Compsn. rich in **alpha lactalbumin** - are prepd. treating whey with an **ion exchange** resin, and concentrating and/or desalinating.

DC B04 D13

IN MATSUNO, I; NAKANO, T; SHIMATANI, M; SUGAWARA, M; UCHIDA, Y

PA (SNOW) SNOW BRAND MILK PROD CO LTD

CYC 4

PI	FR 2671697	A1	19920724 (199238)*	13p	A23C021-00	<--
	JP 04330252	A	19921118 (199302)	4p	A23J001-20	<--
	NZ 241328	A	19931125 (199350)		C07K003-22	<--
	US 5434250	A	19950718 (199534)	4p	C07K015-14	<--
	JP 2961625	B2	19991012 (199948)	4p	A23J001-20	

ADT FR 2671697 A1 FR 1992-545 19920120; JP 04330252 A JP 1991-19114 19910121; NZ 241328 A NZ 1992-241328 19920117; US 5434250 A Cont of US 1992-820369 19920114, US 1994-231984 19940421; JP 2961625 B2 JP 1991-19114 19910121

FDT JP 2961625 B2 Previous Publ. JP 04330252

PRAI JP 1991-19114 19910121

IC ICM A23C021-00; A23J001-20; C07K003-22; C07K015-14

ICS A23C001-14; A23C009-146; A61K039-395; C07K003-24; C07K003-26; C07K003-28

ICA A61K037-02; A61K037-04; A61K038-16; C07K001-34; C07K001-36

AB FR 2671697 A UPAB: 19931113

Compsns. high in **alpha lactalbumin** are prepd. by either of the following processes: (A) a) cheese whey, acid casein whey, or pressure casein whey is adjusted to pH 5 or more; b) the prod. is contacted with an **anion exchange** resin to give an **ion exchanged** soln.; c) the pH is adjusted to 4 or less; d) the soln. is concentrated and/or desalinated.

(B) a) the same starting material as above is adjusted to pH 2-4; b) it is contacted with a cation exchange resin; steps c) and d) are the same as described above. Pref. the material from stage b) is conc. and crystallised to eliminate lactose. The liquor may then be diluted prior to stage c). The desalination stage d) is pref. effected using an ultrafiltration membrane having a mol. mass exclusion size of 10,000-50,000 daltons. Desiccation in stage d) may be effected by drying to a powder.

USE/ADVANTAGE - The product is useful in foodstuffs and medicines. The described processes are cheap and easy to carry out on an industrial scale

Dwg. 0/0

FS CPI

FA AB

MC CPI: B04-B04A6; D03-B; D03-F

ABEQ US 5434250 A UPAB: 19950904

Process for concentrating **lactalbumin** from cheese whey, acid casein whey or rennet casein whey comprises adjusting to pH 5 or higher, contacting with **anion exchanger** and adjusting the **exchanger**-passed soln. to pH 4 or lower, then subjecting to ultrafiltration or diafiltration with membrane having MW cut-off of 10000-50000 to separate the **alpha-lactalbumin** from k-casein glycomacropeptide. Pref. a further concn. and crystallising step of the **exchanger**-passed soln. removes lactose and yields a mother liq. which may be diluted and recycled. **Exchange**-passed soln. may be dried to powder.

USE - Low cost mfr. of high **alpha-lactalbumin** content compsn. for use in food materials and medical materials free of **beta-lactalbumin** which is an allergen using biprods. from cheese mfr.  
Dwg.0/0

L114 ANSWER 15 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1987-016118 [03] WPIX

DNC C1987-006611

TI **Alpha-lactalbumin** recovery from whey - by selective thermal pptn..

DC D13

IN BARTHIER, J P; RIALLAND, J P; BARBIER, J; RIALLAND, J

PA (LAIT-N) LAITERIES BRIDEL SA E

CYC 13

PI EP 209414 A 19870121 (198703)\* FR 8p &lt;--

R: BE CH DE FR GB IT LI LU NL

FR 2583267 A 19861219 (198704) &lt;--

AU 8658876 A 19861224 (198706) &lt;--

US 4782138 A 19881101 (198846) 5p &lt;--

EP 209414 B 19890830 (198935) FR &lt;--

R: BE CH DE FR GB IT LI LU NL

DE 3665248 G 19891005 (198941) &lt;--

US 4782138 B 19920922 (199241) 3p A23J001-20 &lt;--

EP 209414 B2 19931118 (199346) FR 9p A23J001-20 &lt;--

R: BE CH DE FR GB IT LI LU NL

CA 1328950 C 19940426 (199422) C07K015-06 &lt;--

ADT EP 209414 A EP 1986-401243 19860610; FR 2583267 A FR 1985-9153 19850617; US 4782138 A US 1986-876491 19860617; US 4782138 B US 1986-876491 19860617; EP 209414 B2 EP 1986-401243 19860610; CA 1328950 C CA 1986-511672 19860616

PRAI FR 1985-9153 19850617

REP 2.Jnl.Ref; DE 2155696; GB 1313085

IC ICM A23J001-20

ICS C07K003-24; C07K015-06

AB EP 209414 A UPAB: 19930922

Sepn. of **alpha-lactalbumin** (I) from whey proteins is effected by concentrating whey to a solids content of 10-40 wt.%, acidifying to a pH below 4, heating at up to 75 deg.C for 0.25-60 min., and recovering the pptd. (I).

USE/ADVANTAGE - (I) is useful as a component of substitute human milk and non-allergenic milk prods. The process avoids use of expensive **ion-exchange chromatography** equipment.

0/1

FS CPI

FA AB

MC CPI: D03-F01

ABEQ EP 209414 B UPAB: 19940103

Process for selectively separating the **alpha-lactalbumin** from the proteins of whey, characterised in that it comprises a heat treatment of the whey previously concentrated to a dry matter content of 10 to 40% by weight and acidified to a pH less than 4; said heat treatment

being carried out at a temperature of 45 to 60 deg C for a duration of 1 minute to 1 hour or at a temperature of 60 to 75 deg C for a duration of 15 seconds to 1 minute, so as to selectively precipitate the **alpha-lactalbumin**; said heat treatment being followed by the recovery of the **alpha-lactalbumin** in the form of a precipitate and possibly the recovery of the other lacto-proteins remaining in solution in a residual whey.

Dwg.0/1

ABEQ US 4782138 A UPAB: 19930922

**Alpha-lactalbumin** is selectively sepd. from proteins of whey by (a) heat treating whey conc. to dry matter content of 10-40 wt.% and acidified to less than pH 4 to selectively ppte. **lactalbumin**; the (b) recovering prod. from whey. Heat treatment is at 75 deg. C or less for 15-3600 secs. Pref. whey is conc. by reverse osmosis to dry matter content 25 wt.% or less. Acidification comprises **ion exchange** using a cation **exchange** resin in (H<sup>+</sup>)-form.

ADVANTAGE - Method is simple to carry out and has low cost.

ABEQ US 4782138 B UPAB: 19930922

Process for selectively sepg. the **alpha-lactalbumin** from the proteins of whey comprises a heat treatment of the whey previously conc. to a dry matter content of 10-40 wt.%, and acidified to a pH of less than 4, pref. from 3-3.5. The heat treatment being carried out at a temp. not exceeding 75 deg. C., pref. from 45-75 deg. C., for a duration of 15 seconds to 1 hours so as selectively to ppte. the **alpha-lactalbumin**. This heat treatment is followed by the recovery of **alpha-lactalbumin** in the form of a ppte. and possibly of the other lacto-proteins remaining in soln. in the residual whey. The process is simple to carry out and is of low cost. Claims 5-7 are cancelled

0/0

L114 ANSWER 16 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1984-199125 [32] WPIX

DNC C1984-083877

TI Water soluble casein and whey protein ppte. from milk prods. - by adjusting pH above 6.8, heating to denature protein, cooling and adjusting pH below 5.4.

DC D13

PA (NEZU-N) STICHT NED ZUIVELON

CYC 6

PI NL 8204923 A 19840716 (198432)\* 13p <--

AU 8322583 A 19840628 (198433) <--

EP 115651 A 19840815 (198433) EN <--

R: DE FR GB NL

US 4519945 A 19850528 (198524) <--

EP 115651 B 19860820 (198634) EN <--

R: DE FR GB NL

DE 3365478 G 19860925 (198640) <--

ADT NL 8204923 A NL 1982-4923 19821221; EP 115651 A EP 1983-201707 19831130; US 4519945 A US 1983-562102 19831216

PRAI NL 1982-4923 19821221

REP FR 2130606; GB 2063273; GB 704209

IC A23C009-20; A23C021-06; A23J001-20

AB NL 8204923 A UPAB: 19930925

A ppte. of casein and whey protein is prepd. from a milk prod. contg. these by (a) adjusting the pH of the material to over 6.8, (b) heating the resulting material for a combination of time and temp. above that at which the whey protein is denaturated, (c) cooling the prod. to below 65 deg.C, (d) lowering the pH of the soln. to below 5.4 and (e) sepg. the resulting ppte.

Pref. (i) in stage (a) the pH is raised to 7.0-7.5 using a basic cpd. or an **ion exchanger**, and esp. NaOH; (ii) heating stage

(b) is carried out for 5-20 mins. at 80-100 deg.C, esp. 8-12 mins. at 90-98 deg.C, for 60 secs. at 130 deg.C or 5 secs. at 145 deg.C; (iii) in step (c) the mixt. is cooled to 4-45 deg.C; (iv) in step (d) the pH is lowered to 4.4-4.7; (v) pref. before sepg. the ppte. the prod. from step (d) is subjected to direct steam injection or indirect heating; (vi) the ppte. is washed with an aq. liquor at a pH of 4.2-5.4, esp. 4.4-4.7.

ADVANTAGE - The ppte. obtd. has excellent solubility in water at neutral pH, very low Ca content and low ash content. The low ash content and presence of **lactalbumin** makes the prod. esp. useful for the prodn. of baby foods.

O/O

FS CPI

FA AB

MC CPI: D03-B; D03-H01T

ABEQ EP 115651 B UPAB: 19930925

A process for the preparation of a precipitate of casein and whey protein from a milk product containing casein and whey protein, characterised in that (a) the pH of said milk product is adjusted to a value above 6.8, (b) the product obtained in step (a) is heated at a temperature and for a time at least sufficient to denature the whey protein, (c) the product obtained in step (b) is cooled to a temperature below 65 deg. C, (d) the pH of the cooled solution is reduced to a value below 5.4 and (e) the resulting precipitate is isolated.

ABEQ US 4519945 A UPAB: 19930925

Ppte. of casein and whey protein is prepd. from a milk prod. contg. them, by (a) adjusting pH to more than 6.8; (b) heating prod. obtd. at temp. and time to at least denature whey protein; (c) cooling prod. to less than 65 deg.C; (d) reducing pH to less than 5.4; and (e) isolating ppte.

Pref. pH is adjusted in (a) with NaOH or non exchanger. Heating in (b) is carried out at 80-100 deg.C for 5-20 mins. or at 130 deg.C for 60 secs., or 145 deg.C for 5 secs. Cooling temp. is 4-45 deg.C. Ppte. obtd. in (d) is subjected to direct steam injection or indirect heating before isolating prod..

ADVANTAGE - Prod. has low Ca-content (0.1 wt.%) and high protein solubility (i.e. 95).

L114 ANSWER 17 OF 17 WPIX (C) 2003 THOMSON DERWENT

AN 1970-81117R [44] WPIX

TI Fractionated milk components for animal - feedstuffs prepn.

DC D13

PA (MOL-N) MOLKEREI MEGGLE JA

CYC 2

PI DE 1492803 B (197044)\*

NL 138857 B (197322)

PRAI DE 1965-M604270 19650222

IC A23C000-00; A23K000-00

AB DE 1492803 B UPAB: 19930831

Milk is soured by **ion-exchange** treatment and fractionated by acid pptn. of casein. Heat treatment to concentrate the whey, crystalliser of milk sugar (lactose) and removal of **lactalbumin** is effected. Addition of albumin to the whey concentrate forms the basis of an animal feed with carbonates and hydroxides added.

FS CPI

FA AB

MC CPI: D03-B; D03-G

=> d his

(FILE 'HOME' ENTERED AT 11:08:28 ON 27 MAR 2003)

SET COST OFF

FILE 'HCAPLUS' ENTERED AT 11:08:43 ON 27 MAR 2003

```

      E LACTALBUMIN/CT
L1      3145 S E5-E7
      E E4+ALL
L2      4150 S E3
L3      8 S E4-E7/BI
      E LACTALBUMIN
L4      6055 S E3
      E LACTALBUM
      E LACTALBU
      E LACTALB
L5      15 S E2,E4-E12
L6      8 S E14-E20
L7      1 S E33
L8      6071 S L1-L7
L9      160 S L8 AND ?OLIGO?

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FILE 'REGISTRY' ENTERED AT 11:12:38 ON 27 MAR 2003

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      E LACTALBUMIN/CN
L10      1 S E7
L11      111 S LACTALBUMIN(S)ALPHA
L12      115 S LACTALBUMIN

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FILE 'HCAPLUS' ENTERED AT 11:13:55 ON 27 MAR 2003

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L13      65 S L10-L12
L14      6075 S L8,L13
L15      4242 S L14 AND ALPHA
L16      143 S L15 AND ?OLIGO?
L17      239 S L14 AND MOLT?
L18      2592 S L14 AND ?GLOBUL?
L19      39 S L16 AND L17,L18
L20      50 S L15 AND POLYMERIZ?
L21      32 S L20 AND L17,L18
L22      66 S L19,L21
      E SVANBORG C/AU
L23      126 S E3-E8
      E SVANBOERG C/AU
      E HAKANSSON P/AU
L24      66 S E3,E6,E7
      E SVENSSON M/AU
L25      62 S E3,E13,E15
      E HAKANSSON A/AU
L26      48 S E3-E7
L27      13 S L23-L26 AND L14
L28      3 S L27 AND ION(S)CHROMATOG?(S)EXCHANG?
L29      3 S L28 AND L15-L22
      E ION EXCHANGE/CT
      E E3+ALL
L30      21903 S E3+NT
      E E11+ALL
L31      6940 S E4+NT
      E E45+ALL
L32      42249 S E5,E4+NT
L33      76 S L14 AND L30-L32
L34      76 S L33 AND L14
L35      143 S L14 AND (ION OR ANION) (S)EXCHANG?(S)CHROMATOG?
L36      124 S L15 AND L35
L37      161 S L33-L36
      E CASEIN/CT
      E E3+ALL
L38      25 S L37 AND E1,E2
      E E2+ALL
L39      39 S L37 AND CASEIN

```

L40 39 S L38,L39  
L41 2 S L40 AND CHELAT?  
L42 1 S L40 AND EDTA

FILE 'REGISTRY' ENTERED AT 11:31:22 ON 27 MAR 2003

L43 1 S 60-00-4  
L44 1 S 7647-01-0  
L45 436 S 60-00-4/CRN  
L46 1 S 1185-53-1  
L47 1 S 77-86-1  
L48 942 S 77-86-1/CRN  
L49 1 S 112-80-1  
L50 2556 S 112-80-1/CRN  
L51 757 S L50 AND 2/NC AND C18H34O2 NOT IDS/CI  
L52 687 S L51 NOT UNSPECIFIED  
L53 1 S 7647-14-5  
L54 1 S 80701-61-7  
E DEAE/CN  
L55 2 S E33,E34

FILE 'HCAPLUS' ENTERED AT 11:33:40 ON 27 MAR 2003

L56 1 S L43,L45 AND L37  
L57 3 S L44 AND L37  
L58 1 S L47,L48 AND L37  
L59 1 S L49,L52 AND L37  
L60 8 S L53 AND L37  
L61 1 S L54,L55 AND L37  
L62 8 S L56-L61  
L63 180 S L1(L) PREP?/RL OR L2(L) PREP?/RL  
L64 5 S L63 AND L62  
L65 5 S L64 AND ALPHA  
L66 4 S L65 NOT ANX/TI  
L67 6 S L29,L66  
L68 4 S L62 AND L67  
L69 6 S L67,L68  
L70 136 S L37 AND (PY<=1998 OR PRY<=1998 OR AY<=1998)  
L71 25 S L70 AND L63  
L72 21 S L71 NOT L69  
L73 20 S L72 AND ALPHA (S) LACTALBUM?  
SEL DN AN 1 7 9 10 16  
L74 15 S L73 NOT E1-E15  
L75 21 S L69,L74  
L76 110 S L70 NOT L71-L75  
L77 0 S L76 AND CHELAT?  
L78 1 S L76 AND (L43,L45 OR EDTA OR ETHYLENEDIAMINETRETRA? OR ETHYLEN  
L79 21 S L75 AND L1-L9,L13-L42,L56-L78  
L80 28 S L63 AND (?OLIGO? OR ?POLYM? OR ?MULTIMER?)  
L81 11 S L80 AND L37  
L82 8 S L70 AND L81  
L83 2 S L82 NOT L79  
L84 23 S L75,L82  
L85 2 S L84 NOT L75  
L86 21 S L84 NOT L85

FILE 'HCAPLUS' ENTERED AT 12:05:57 ON 27 MAR 2003

FILE 'WPIX' ENTERED AT 12:06:43 ON 27 MAR 2003

E LACTALBU  
L87 336 S E2,E4-E8/BIX  
E SVANBORG C/AU  
L88 6 S E3,E4,E5  
E SVANBEORG C/AU  
L89 1 S E25

E HAKANSSON /AU  
L90 12 S E4  
L91 17 S E40,E41  
E SVENSSON M/AU  
L92 38 S E3,E7  
L93 1 S E66  
E MALIN/AU  
L94 3 S E62  
L95 106 S C07K014-76/IC, ICM, ICS  
L96 145 S A61K038-38/IC, ICM, ICS  
L97 4 S L88-L94 AND L87,L95,L96  
L98 545 S L87,L95,L96  
L99 1 S L98 AND N152/M0,M1,M2,M3,M4,M5,M6  
L100 40 S L98 AND (ION OR ANION) (S)EXCHANG?/BIX  
L101 74 S L98 AND (OLIGO? OR MULTIMER? OR MULTI-MER? OR POLYMER?)/BIX  
L102 44 S L98 AND CHROMATOG?/BIX  
L103 12 S L100,L102 AND L101  
L104 445 S L98 AND (PY<=1998 OR PRY<=1998 OR AY<=1998)  
L105 46 S L100,L102 AND L104  
L106 10 S L101 AND L105  
SEL DN AN 1 3 7  
L107 3 S E1-E6  
L108 6 S L97,L99,L107  
L109 276 S L87 AND L104  
L110 22 S L109 AND L105  
L111 19 S L110 NOT L108  
SEL DN AN 2 3 8 12 13 15 17 18  
L112 11 S L111 NOT E7-E22  
L113 14 S L108,L112 AND ALPHA  
L114 17 S L108,L112,L113

FILE 'WPIX' ENTERED AT 12:35:49 ON 27 MAR 2003